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MARCH 1988

VOLUME 6
NUMBER 3

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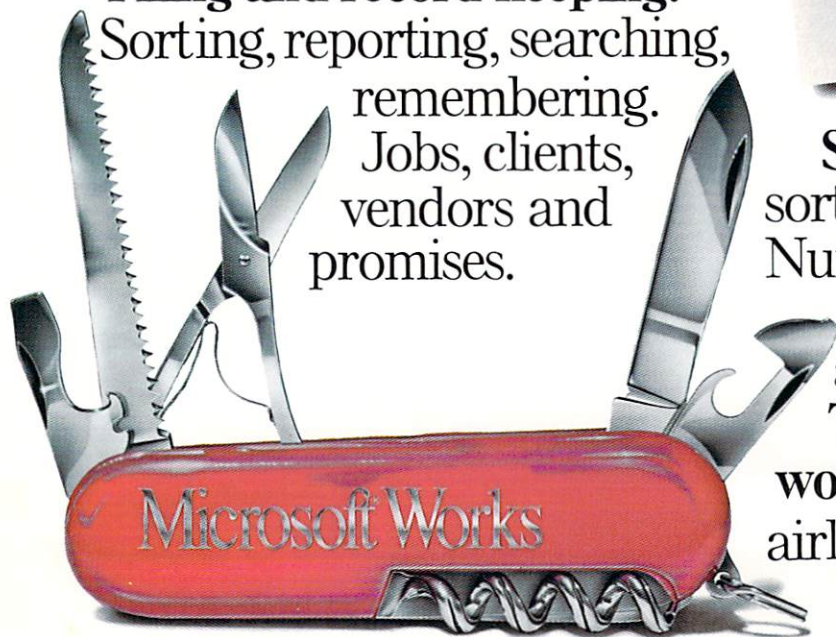
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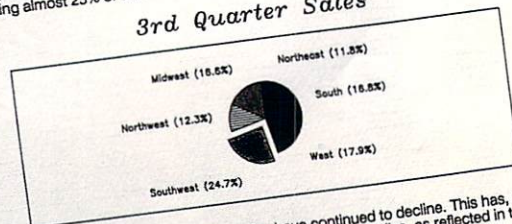
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Redmond, WA 98073

Dear Jon:

Congratulations!

Your hard work during the past few months has resulted in the most successful 3-month sales period in the history of Progressive Office Supplies. All six regions increased sales over the previous 3-month period, with the Southwest Region posting record sales of \$117,282.12, representing almost 25% of our total 3rd Quarter sales.

3rd Quarter Sales



As anticipated, the sales of typewriter supplies have continued to decline. This has, however, been more than offset by the increased sales of computer supplies, as reflected in the table below:

	APRIL	MAY	JUNE	TOTAL
Copier Supplies	\$27,101.22	\$24,456.65	\$33,140.97	\$84,698.84
Computer Supplies	\$36,387.26	\$45,776.13	\$44,600.59	\$126,763.98
Typewriter Supplies	\$42,735.40	\$45,688.66	\$40,214.73	\$128,638.79
Mallroom Supplies	\$45,122.10	\$42,678.40	\$47,603.15	\$135,403.65
TOTAL SALES	\$151,345.98	\$158,599.84	\$165,559.44	\$475,505.26

Again, congratulations to you for such a strong 3rd Quarter. I look forward to thanking you in person at the sales meeting next month in Hawaii.

Sincerely,

Frank Addison
Frank Addison
President

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	MAY	JUNE	REGIONAL SUBTOTALS
	\$3,738.00	\$4,853.70	\$12,373.01
	~ 985.05	\$4,885.74	\$13,295.38
	~ 95	\$5,482.26	\$14,192.31
		\$7,834.23	\$18,726.07
		\$5,018.58	\$12,936.78
		~ 96.46	\$13,175.29
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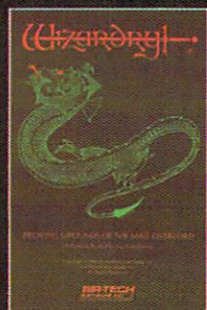
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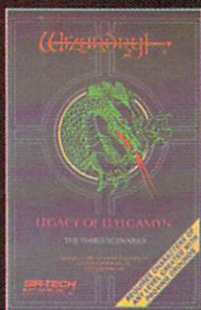
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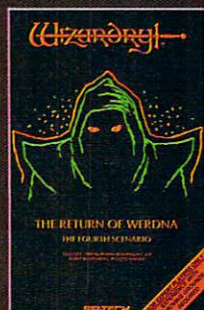
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1988VOLUME 6
NUMBER 3

FAMILY & HOME OFFICE COMPUTING

COVER STORY

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Assemble a more powerful and efficient computer system through an understanding of IBM/MS-DOS compatibility. Includes prices and specifications for complete 286 and 386 systems from leading manufacturers, plus a description of OS/2 and IBM's new PS/2 line.

THE OFFICE AT HOME

8 ELECTRONIC MARKETING

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64 USING HYPERCARD EVERYONE'S FIRST SCRIPT

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77 THE PROGRAMMER

News and updates for programmers, and this month's programs: *Melody Game* (Fun with Music); *Hidden Digits* (Game Program); *Word Search* (Puzzle); and *Bumble Bee* (Microtones).

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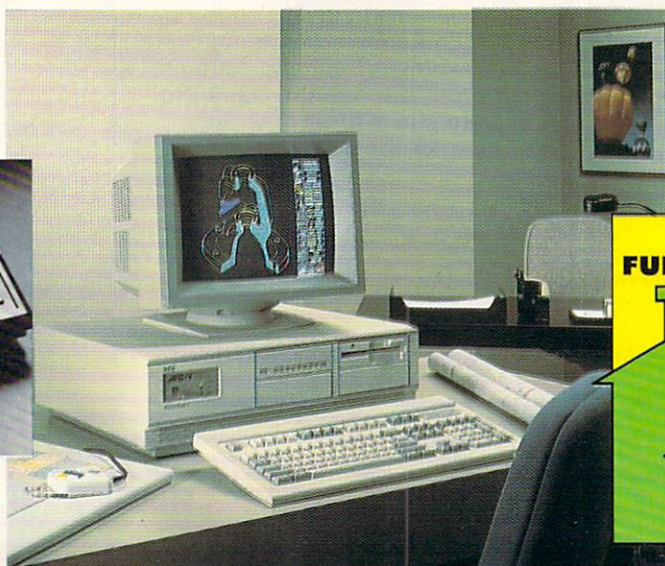
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SELF-DESCRIBED FULL-TIME HOMEWORKERS

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MARCH 1988 3

EDITOR'S NOTE

NICK AND TOM AND MILLIONS MORE ARE GROWING UP AND STAYING HOME

When Nick Sullivan was at Harvard and Tom Miller at Yale, neither imagined he would grow up and stay home. But that's what has happened. And it's by choice. Anyone would want either of these bright, warm, quirky, handsome, and extremely productive guys around the office water cooler. But that's not the way they want to play.

Regular readers of FAMILY & HOME-OFFICE COMPUTING are familiar with Senior Editor Sullivan's handiwork every issue, both in the articles he edits and the stories he writes. Some of you who visit this spot regularly may remember my having mentioned that he telecommutes. So it just seemed natural to assign him the article on Tom Miller, another homemaker, and his 1987 National Work-At-Home Survey. In actuality, putting Miller and Sullivan together was as much an accident or stroke of luck as anything. The combination just works.

Both guys are low-key, but while everyone else is still scrambling, they've turned out the most amazing amount of work—and it's good. Very good. And they do it at home. Both assert that because of all the interruptions, their productivity goes way down at the office. In fact, according to Miller's survey, the number-one advantage cited for working at home is increased productivity.

With 23 million Americans doing some part of their job at home and the number rapidly climbing, you'll want to read Sullivan's interview with Miller (page 48). Whether you're already part of this much talked about lifestyle, giving it serious consideration, or even certain you'd never want to live that way, you'll enjoy reading the latest research that Miller has compiled.

FAMILY & HOME-OFFICE COMPUTING readers who are also homeworkers



own more MS-DOS computers than any other type of machine. They, along with all the other computer owners and prospective computer owners, will want to focus their attention on our cover story, "Solving the IBM-Compatibles Puzzle" (page 41). Contributing editor Steve Morgenstern guides us through the current maze of options available to the consumer, clearing up and warding off confusion along the way.

I believe you'll find that this entire issue is filled with helpful and practical articles and ideas—how to market a product on-line; improving SAT scores; how to simplify the tax-preparation process; organizing your hard drive; how to get more from your word processor; beating your favorite games. There's more—just take a quick run through the table of contents.

One more reminder of a new service to make life a little easier—we're now offering many of our ever-popular, original programs on disk. Reader requests prompted us to convert these programs to disk, thereby saving you hours of keyboarding, correcting typing errors, and plain old frustration. Interested readers will find more about these disks and how to order them on page 87.

Claudia Cohl

CLAUDIA COHL, EDITOR-IN-CHIEF

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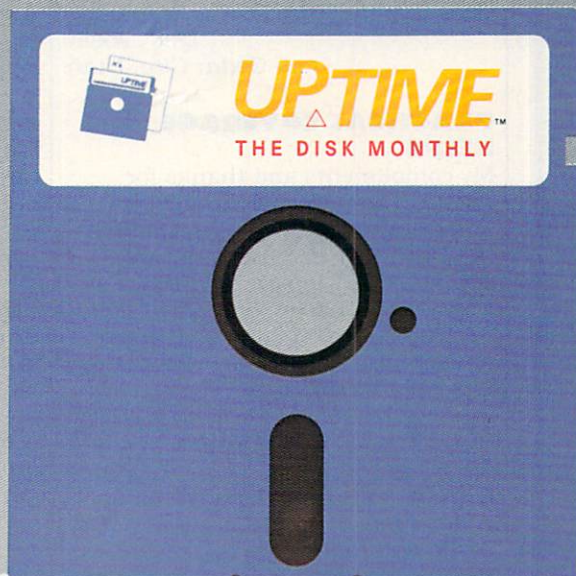
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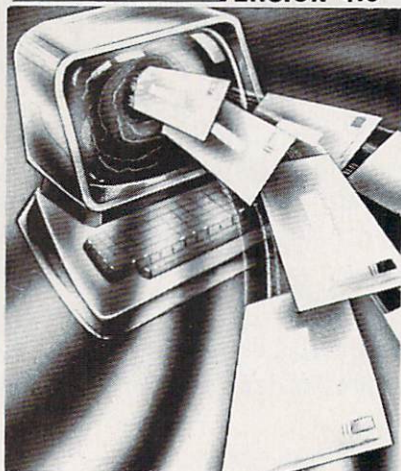
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LETTERS

OBSERVANT READERS

Upon reading the "1987 in Review" article in the December issue, I discovered that the picture of the Leading Edge Model D2 (page 51) was reversed. Despite this minor mistake, however, I feel that FAMILY & HOME-OFFICE COMPUTING has been the friendliest magazine of all those to which I subscribe. Keep up the good work!

PHILIP HSU
San Marino, California

In your most recent "Buyer's Guide to Computers" (November 1987), you mentioned the Leading Edge 15-month warranty. I just received a Model D, and the company has now extended its warranty to 20 months.

Also, the Model D pictured in that feature appears to be the newer AT-class Leading Edge D2.

LYNN CROSBY
Cedar City, Utah

PRACTICAL COVERAGE HELPS

My compliments and thanks for "Getting More from Spreadsheets and Databases" by Rob Krumm in the December and January issues. The subject is topical, and the articles well written.

This is also a request that you provide instructional articles of this type on a regular basis.

LEONARD A. BARZAN
Green Valley, Arizona

EDITOR'S NOTE: Thank you for your comments. This kind of input helps us determine the type of coverage that our readers will find most useful. "The MS-DOS Hard-Disk User's Guide" on page 50 of this issue is an example of the instructional articles on applications you can expect to see on a regular basis.

Your magazine is terrific! I especially enjoyed the article about "A Home Budget That Works" in your December issue.

Could you point me in the direction of a simple, reliable budget-control program that a nonprogrammer could use effectively?

KENITH TEMPLIN
Redmond, Washington

EDITOR'S NOTE: Our January cover story, "A Guide to Fiscal Fitness," describes several programs that manage personal-finance functions

(including budgeting), and the November 1987 Personal Finance column takes an in-depth look at Quicken, the popular check-writing program that can help you compare budgeted expenses with actual expenses.

KEEPING IT LEGAL

I would like to see you cover the legal aspects for operating a home business: zoning ordinances; business licenses; sales, Social Security, unemployment, and other taxes; and additional legal matters.

The costs of these various items should be figured into the charges for your services if you are to make a profit.

RAY TACKETT
Paoli, Pennsylvania

EDITOR'S NOTE: We will be covering these topics in future issues of FAMILY & HOME-OFFICE COMPUTING.

A GOOD QUESTION

Why did you change your name from FAMILY COMPUTING to FAMILY & HOME-OFFICE COMPUTING?

JASON TORREY
Garden City, Kansas

EDITOR'S NOTE: To quote Editor-in-Chief Claudia Cohl's October 1987 Editor's Note: "The challenge was to make it obvious that 'FAMILY COMPUTING' included all at-home computing activities. . . . We would have to expand our title to include the newest and fastest-growing interest of our readers. . . . And so . . . we became FAMILY & HOME-OFFICE COMPUTING."

FINANCE SOFTWARE UPDATE

MoneyMate, the full-featured personal-finance program listed in January's "A Guide to Fiscal Fitness" (page 35), is now available in Version 2.0 from Practical Software ([813] 447-3100; IBM PC, \$100). The new package will run with all types of monitors. Call (800) 852-5666 for a free demonstration disk.

Version 1A1 (IBM PC with CGA; \$170) is still available from its publisher, RealWorld Software ([603] 224-2200).

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THE OFFICE AT HOME

ELECTRONIC MARKETING

How a Computer (and Sometimes a Modem) Can Help Market Your Product **BY LYNIE ARDEN**

How can I use a computer to help market my product? That's a question a lot of home- and small-business owners ask. Indeed, a lot of good products and good ideas wither for lack of good marketing.

You can, of course, use your computer, a database, and a word processor to generate mass mailings, a key part of many marketing campaigns. But beyond that, there are a number of less obvious ways a computer can help tell potential customers about your product and even help fill orders. Most require a modem, that omni-useful tool that links your computer—via telephone lines and satellites—to the outside world. Here's a look at some ideas that may be suited for your business.

AUTOMATED CALL TAKER

You've probably heard of, or experienced, automated outbound telemarketing. That's when the computer is programmed to call you and deliver a sales pitch. It's not the nicest side of high-tech marketing. The flip side is an automated inbound marketing service bureau, which is very efficient for the business owner and "soft" enough not to offend people. It's often called Audio Storage and Dial Access Retrieval (ASDAR).

Let's say you place an ad in a magazine to sell a certain product. Included in the ad is a toll-free number. Rather than hiring an operator to stand by the phone and answer questions and take orders, you could use an ASDAR system that was pre-programmed with your voice to create an interactive script. It will cost you at least 50 to 60 percent less than a live operator would. Callers can be guided through interactive voice prompts to give a name, address, phone number, credit card number, and product order. The ser-



vice bureau that receives the information then forwards the data to you electronically via MCI Mail. For a demonstration of such a system, call DIALRESPONSE ((800) 336-4488), a division of CommSEL ((714) 646-2440).

Customized questions can be designed to elicit additional information, such as type of computer owned and age and number of children. This will help you build a secondary market with related products. It will also enhance your mailing list, thereby making it more valuable to renters.

TELEMARKETING SOFTWARE

Still, for the most part, telemarketing works best when there's a human involved. There are all kinds of telemarketing software packages around now, and some of them are loaded with features.

One highly rated package, *Tele-Magic* (Remote Control, [619] 481-8577; \$295 for professional version), has been called the salesperson's Swiss Army knife, because of its versatility. It can track 1 billion contact names and phone numbers (if you have enough hard-disk storage space); tell you when they were called last and what was discussed; act as a tickler file by letting you know when you should call again; feed you phrases to overcome customers' objections and bring you back to the close; print out personalized form letters, envelopes, invoices, packing slips, labels, and

thank-you notes; and keep track of inventories. And all of this is done simultaneously.

PAPERBACK MARKETER

Word-of-mouth advertising is the lifeblood of the home-based entrepreneur; and networking through electronic bulletin boards is one of the best ways to prime the pump.

Anyone can tack a "for sale" message on a bulletin board. But it takes more creativity than that to really maximize electronic networking, as Jaron Summers showed. When his paperback thriller *Safety Catch* (Leisure Books, New York) was published, he was worried that his book would be removed from the racks in less than eight weeks. He was determined not to let that happen.

The plot of the book itself inspired his marketing brainstorm. The hero in Summers's detective story saves the day when he taps into a computer system. Since the story involved a computer, it seemed likely that computer owners would be interested.

Summers offered the first chapter of *Safety Catch* free to anyone who wanted it via CompuServe and The Source. The idea was to pique enough interest to motivate the reader to go out and buy the book and maybe tell friends about it.

But that was only the beginning. Summers also offered \$5 to anyone (a \$50 maximum per household) who would simply post the first chapter on one of the thousands of free electronic bulletin boards. Chapter one was posted on more than 400 bulletin boards, each of which had more than 1,000 users.

The result? For a total outlay of around \$5,000, *Safety Catch* went into its second printing within two months and sold more than 100,000 copies. Summers later sold a movie option for \$50,000. Not bad for a novel that would typically have sold less than 8,000 copies!

SHAREWARE

Giving away a sample, as Summers did, is one thing, but how

Contributing editor LYNIE ARDEN is editor and publisher of *Workstader*, a newsletter for home-business owners. Her last article for FAMILY & HOME-OFFICE COMPUTING was "Job Training and Placement for the Homebound," which appeared in the January issue.



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- ☒ **GRAPHICS 2a,b,c**—(3 disks) An excellent 3-D surface modelling and shading program. Color.
- ☒ **INFO 2a,b**—(2 disks) Zip-Phone, national areacode/prefix to zip-code cross reference.
- ☒ **LANGUAGE 3a,b**—(2 disks) The A86 3.09 macro assembler and debugger for 8088/86/286s.
- ☒ **SHELL 4a,b**—(2 disks) Automenu and HDM II 4.04 hard disk prog. for custom full-screen menus.
- ☐ **UTILITIES 5**—Hard disk utilities for verifying, formatting, parking and optimizing your disk drives.
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- ☒ **WORD 1a,b**—(2 disks) PC Write 2.71, a powerful word processing system w/spell checker, laser supt.

Most software listed is shareware or user-supported.

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THE OFFICE AT HOME

about giving away the whole enchilada? Would you believe you could make a profit?

That's exactly what happens with shareware. Shareware is software that is available free to anyone who wants to try it. If you like it, you're expected to "register" as a user and pay for it (at rates significantly reduced from commercial prices). The marketing and manufacturing costs are almost nonexistent.

Once a program is developed, all the author has to do is upload it onto as many bulletin boards as he can find and sit back and wait for the registrations. One success story is that of Tom Smith and Bruce Barkelew, both from Columbia, Missouri. Their company, Datastorm Technologies, Inc., has produced ProComm, an IBM communications software product.

ProComm (see review in this month's *Telecomputing department*) has been available on hundreds of electronic bulletin boards since August 1985. Fourteen months after incorporating, the company passed the million-dollar mark in sales. More than 35,000 users—an estimated 3 to 7 percent of the total users—have registered.

PR NEWSWIRE

Experienced entrepreneurs will tell you there's no advertising like publicity. One way to get publicity is to send a story about your business to the publication or TV station you'd like to see use it. You can send copies of these press releases to every publication in the country and spend lots of money on paper and postage doing it.

But there's a better way. It's called PR NewsWire ([800] 321-8169). You access this network, then use your computer and modem to transmit the message. PR NewsWire then transmits the message directly to the newsrooms, radio stations, wire services, and magazines you selected. You can pinpoint a marketing region for as little as \$35 or blanket the country for only \$325.

Bruce David of Twinsburg, Ohio, used the service to promote his home-based advertising agency services. The release he sent via PR NewsWire resulted in articles in nearly a dozen newspapers throughout the country, plus 12 minutes of airtime on national TV (NBC). David says the publicity enhanced his credibility, landed him several good

referrals, and increased his sales by 10 percent.

THE ELECTRONIC MALL

In an electronic age, are storefronts really necessary? CompuServe doesn't think so. The Electronic Mall has more than 90 merchants, whose offerings are available to CompuServe ([614] 457-8600) subscribers 24 hours a day.

Merchants pay an annual minimum of \$5,250 to participate, but can pay up to \$80,000, depending on the extent of their offerings. More than 3.1 percent of Mall entries result in sales (each averaging \$45).

Merchants range in size and stature. The Coffee Emporium, for instance, is a home-based business run by husband-and-wife Rosemary and Norm Belssner, of San Ramon, California. The pair had wanted to open a traditional gourmet coffee store, but the start-up money was more than they were willing to commit. So when Norm ran across an ad for The Electronic Mall, he realized it was the answer to their dream. They paid less than \$10,000 to start the Coffee Emporium.

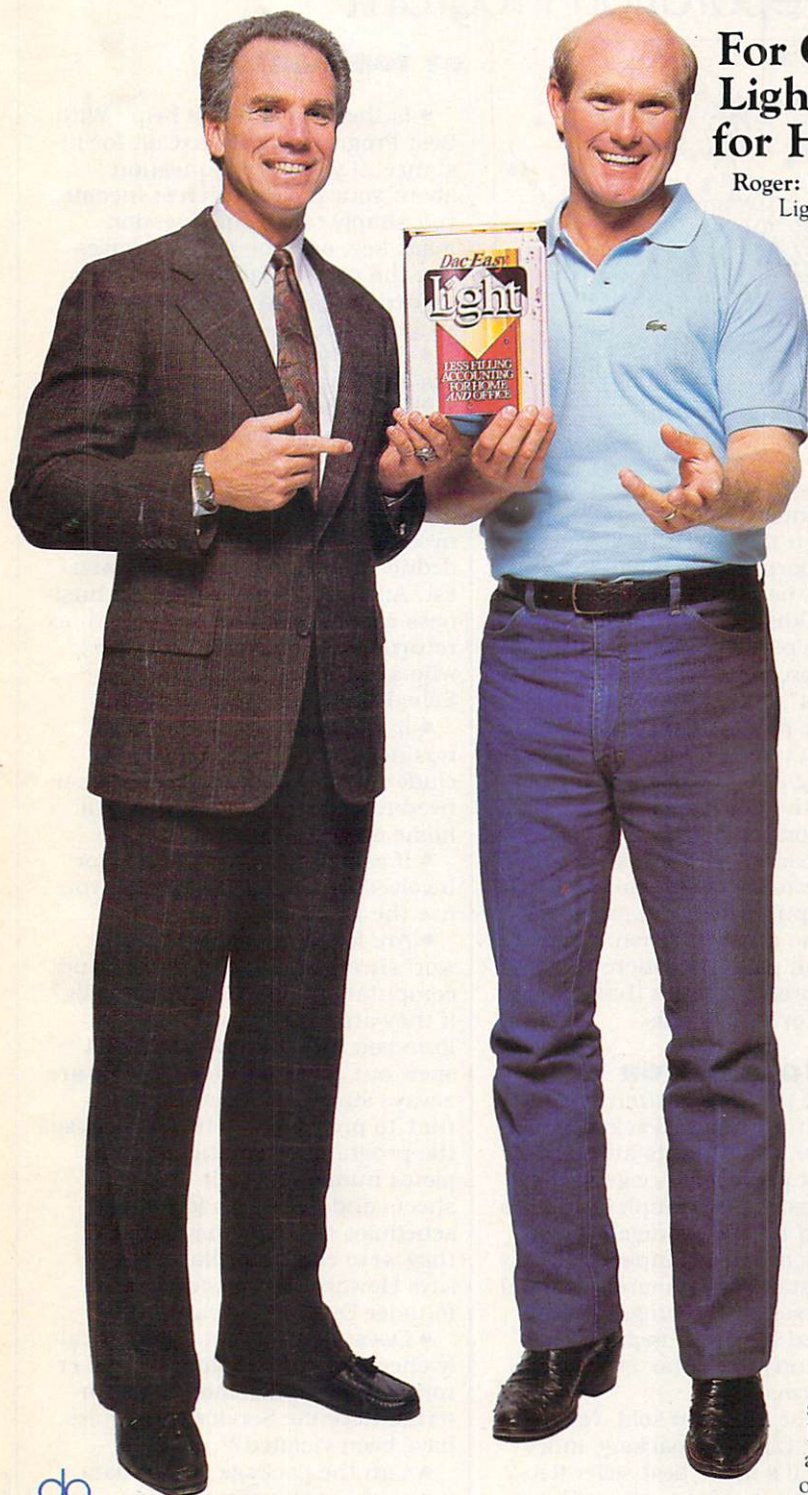
To shop at the Coffee Emporium, a CompuServe subscriber types GO COF to enter the store. From there, it's just like being in a real coffee store—minus the aroma. There are descriptions of the different coffees, complete with taste charts.

The customer can place an order by using his or her MasterCard or Visa. The order is filled within 48 hours, fresh from the roaster. Nothing is inventoried. "The reason this works for us is the quickness with which we work," says Rosemary. "There's no sending away for a catalog, then sending in an order, and waiting a week or two for the order to be filled. Everything is immediate. That's good for us and good for our customers."

FROM MAINE TO CALIFORNIA

This kind of electronic marketing could be the biggest boon of all for small-business owners. They can reach potential customers all over the world. And they don't have to pay for retail or inventory space. A coffee shop outside San Francisco could only hope to attract foot traffic from a few blocks away. Now those same proprietors, with an "electronic" coffee shop, can sell their special blends to coffee lovers as far away as Maine. ■

Roger Staubach and Terry Bradshaw on Dac-Easy Light.



For Once They Agree! Light's Less Filling Accounting for Home & Office.

Roger: Of course I'd never argue with you, Terry, about Dac-Easy Light because I know it's perfect for office accounting.

Dac-Easy Light let's me concentrate on doing business, not accounting. Using the predefined chart of accounts, ideal for small business, I can enter customers and vendors — and start processing invoices and checks in just minutes!

Terry: Roger, when did we ever disagree about anything? You know Dac-Easy Light is perfect for home accounting. Light makes home finances fast, fun and easy. The preset home chart of accounts has everything I need. I can write checks and do bank reconciliations by computer without knowing the first thing about accounting.

Roger: Light makes it a snap to track sales and budget expenses for up to 12 months on-line. With Light, I know my business' current financial status in *minutes*.

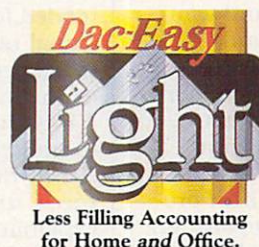
Terry: It's the same with home accounting finances, Roger. I can get my personal net worth in *seconds* since Light instantly reflects the effect of changes, payments, withdrawals and deposits.

Roger: Light gives me the option of handling accounting on a cash or accrual basis. Plus, if I forget any account or customer, I can quickly call it up in a window.

Terry: Well don't forget this, Roger. With Dac-Easy Light I can quickly set up new credit card accounts, post receipts, and keep tabs on current card balances. Plus, I don't have to know debits or credits because the system knows and automatically does them for me.

Roger: Terry, for once I think you're right. Light's so smooth and easy to handle, *even you can use it*.

Terry: And you're right, too, Rog. Using Light, you'll have more time to spend on the golf course. I just hope you're not trying to compete with my *hall of fame game!*



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FINANCE

BE YOUR OWN TAX GURU

How to Choose a Tax-Preparation Program That's Right for You

At the risk of upsetting fellow accountants, I'm going to tell you a little secret: Even though accountants can give you invaluable tax advice, their calculators and computers aren't any smarter than yours are. And I'll divulge another secret: You're probably more tax savvy than you give yourself credit for. During these next few weeks, offices, homes, and restaurants across the country will buzz with conversations about 1040s, Schedule Cs, and itemized deductions. If you ask me, many of you actually enjoy talking about taxes.

Yet, too many taxpayers like you still take your proverbial shoe boxes of receipts, paycheck stubs, bank statements, W-4s, and the like to your accountants' offices, say "Get me back as much money as you can," and walk out. No questions asked.

Maybe your tax circumstances are extraordinarily complicated or maybe you really don't know a darned thing—and don't care to know—about tax laws. If so, you'll always need your accountant. But if you're just a bit intimidated by tax forms or just a bit lazy, you should take a closer look at tax-preparation software.

If you own a computer, you probably know about—or already have—a tax-preparation program. Tax-prep software is for people who want to prepare their own individual income tax returns—and want to do so more accurately and knowledgeably and less tediously. (These programs are also good for individuals who want to prepare their own draft tax returns and then consult accountants for advice.) In fact, some of the best programs available for tax preparation, such as HowardSoft's *Tax Preparer* and SoftView's *MacInTax* and *Tax-View*, were created by non-tax professionals who wanted to make tax preparation less painful.

Over the last couple of years, I've looked at a number of tax-preparation packages that were written for individual taxpayers. (With the new

TOM MORTON is an accountant living in New York City.



tax code going into effect this year, some of the tax-software publishers have taken the rewriting required as an opportunity to make their programs better.) Below, I've created a checklist of questions to ask when you're shopping for a suitable tax-preparation package. The more "yes" answers you give, the better the program will be for you. If you can't answer these questions by looking at the package, flip through the manual or ask a salesperson for assistance. And if you still can't find out everything you'd like to know, try calling the software publisher's customer service phone number. Then, refer to the box on page 14, where you'll find tax-prep packages that are suitable for individuals.

WHAT TO LOOK FOR

- Is the package written specifically for individuals? Packages intended for accountants and professional tax preparers are generally too expensive, too complex, and too confusing for the average user.

- Is the manual complete yet easy to understand? The manual should clearly describe the program's features, and it should include clear explanations of the tax laws and of all the forms.

- Has the program sold well in the past? Does the package indicate that it's made best-seller lists?

- Will you be able to get updates of the program each year? For a reasonable price? Because tax laws change, tax-preparation programs need yearly updating.

- Does the program give tax advice?

BY TOM MORTON

- Is there any on-line help? With Best Programs's *PC/TaxCut*, for instance, if you have a question about your child's interest income, you simply touch the question mark key, and the program gives you the rules regarding interest earned by a child and tells you the special forms you need to fill out.

- Does the program show replicas of the tax forms on-screen?

- Does the package perform the calculations for all of the forms, schedules, and worksheets that you may need? For instance, if you are paying off a mortgage, you'll need Schedule A so that you can deduct your home-mortgage interest. And employees who claim business expenses on their personal tax returns need Form 2106; those who are self-employed would use Schedule C.

- If you operate a home-based business, does your package include the forms and schedules you need to deduct the expenses of a home office?

- If you are a sole proprietor or involved in a partnership, can you use the program?

- Are forms, schedules, and worksheets all linked together and computations made automatically? If they are, you may find that a form you didn't know about will spew out of the printer. "People are always surprised when it comes time to print their returns because the program automatically completes numerous built-in worksheets and generates forms and schedules that they never knew they were eligible or liable for," says HowardSoft president and founder Dr. J.E. Howard.

- Does the program automatically check for inconsistencies and errors and let users know when Internal Revenue Service (IRS) rules have been violated?

- Can the package accept data from other software, such as spreadsheets?

- Does the program change your tax liability each time you plug in a new figure? This feature lets you make estimates. For instance, you can instantly see how much money

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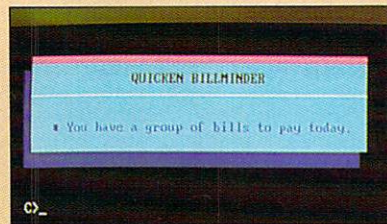
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Here's what the critics say:

"I've never seen such an easy-to-use manual or software that's so simple to use." Martin Blumenthal, in *Cider Magazine*

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Esther Dyson, Industry Analyst

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Software Compatibility: Exports data and reports in ASCII. Also exports in Lotus® format with optional Transfer Utility.

Hardware Compatibility: All IBM® PC, AT®, PS/2® and compatibles with 256K RAM and DOS 2.0 or higher. All printers. All monitors. Also available for Apple® IIe, IIc and GS with most of the same features.

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FINANCE

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- Can the program create and print out an IRS-approved 1040, 1040EZ, or 1040A? (Any tax forms that have to be signed need special approval from the IRS.)

- Does the program let you create and print out other forms, worksheets, and schedules that can be

mailed to the IRS?

- If the package doesn't create its own forms and schedules, will it let you print information onto tax forms that you can feed through your printer?

MAKE APRIL LESS TAXING

I won't promise you that completing your tax returns on your computer is any faster than doing it by

hand. And if you're trading in a human tax preparer for software, computerized tax preparation may not even be cheaper, at least initially. But tax-preparation software *will* help you be better organized, more complete, and more accurate. And if you start with electronic tax preparation now, you'll be ready for the future, when the IRS lets you electronically file your tax returns. ■

TAX-PREPARATION PACKAGES

Ask DAN About Your Taxes

MANUFACTURER: Legal Knowledge Systems, Inc., 195 Maplewood St., Watertown, MA 02172; (617) 923-2322

HARDWARE REQUIREMENTS: 512K IBM PC

PRICE: \$70

PRICE FOR YEARLY UPDATE: not yet determined

COMMENTS: Menu-driven program leads you through individually tailored questions and finds deductions; questions take account of responses that you have already given. Features include on-screen tax forms, automatic recalculation, pop-up scratch pad, and printing of IRS-acceptable forms (except the 1040). Can accommodate up to 50 partnerships and/or 10 businesses.

FORMS: 1040, 1040ES, 2106, 2119, 2210, 2441, 3903, 4562, 4684, 4797, 6251, 6252, 8582, 8598, 8606, 8615

SCHEDULES: A, B, C, D, E, F, R, SE

J.K. Lasser's Your Income Tax

MANUFACTURER: Simon & Schuster Software, One Gulf + Western Plaza, New York, NY 10023; (201) 767-5937

HARDWARE REQUIREMENTS: IBM PC

PRICE: \$70

PRICE FOR YEARLY UPDATE: \$40

COMMENTS: Produced in conjunction with the J.K. Lasser Tax Institute, whose best-selling tax guide comes free with the program. Prints IRS-approved forms and schedules (except the 1040). Shares data among forms, has an on-screen calculator, and automatically transfers calculations from the worksheets to the forms. Includes an analysis section that tells you the best way to file and an interview system that indicates the forms to use.

FORMS: 1040, 1040A, 1040EZ, 2106, 3903, 4797, 8582, 8598, 8606, 8615

SCHEDULES: A, B, C, D, E, F, I, R, SE

MacInTax and TaxView

MANUFACTURER: SoftView Inc., 4820 Adohr Lane, Suite F, Camarillo, CA 93010; (805) 388-2626

HARDWARE REQUIREMENTS: Apple IIGs, 512K Macintosh, 512K IBM PC

PRICE: \$119

PRICE FOR YEARLY UPDATE: \$45

COMMENTS: Print out forms, including the 1040, that you can send directly to the IRS. Display replicas of forms on-screen—can be filled out line by line. Automatically perform all computations

and check for errors. Link together 40 worksheets, forms, and schedules. Import ASCII files. State supplements for New York and California are available for \$65 each.

FORMS: 1040, 1040A, 1040ES, 1040EZ, 2106, 2119, 2210, 2441, 3903, 4562, 4562A, 4684, 4797, 4868, 4952, 6251, 6252, 8283, 8582, 8598, 8615

SCHEDULES: 1, A, B, C, D, E, F, R, SE

PC/TaxCut

MANUFACTURER: Best Programs, Inc., 2700 S. Quincy St., Arlington, VA 22206; (703) 820-9300

HARDWARE REQUIREMENTS: 312K IBM PC

PRICE: \$75

PRICE FOR YEARLY UPDATE: \$45

COMMENTS: Instantly recalculates tax owed or refund due, along with the current tax bracket and taxable income of the taxpayer, every time a number changes. Includes context-sensitive on-screen help and an easy-to-understand user manual. Creates and prints out an IRS-approved 1040. Tax-preparation advisory service is available for \$1 per minute (with a 15-minute minimum).

FORMS: 1040, 1040ES, 2106, 2119, 2210, 2441, 3468, 3800, 3903, 4562, 4797, 4952, 5695, 6251, 8582, 8598, 8615

SCHEDULES: A, B, C, D, E, F, SE

Sylvia Porter's SwiftTax

MANUFACTURER: Timeworks, Inc., 444 Lake Cook Road, Deerfield, IL 60015; (312) 948-9200

HARDWARE REQUIREMENTS: 128K Apple, IBM PC

PRICE: \$50-\$70

PRICE FOR YEARLY UPDATE: \$25-\$35

COMMENTS: Can print data onto IRS-approved forms. Features include a built-in calculator and memo pad and context-sensitive help screens. Checks for alternatives.

FORMS: 1040, 1040A, 1040EZ, 2106, 2441, 3903, 4562, 6251, 8615

SCHEDULES: A, B, C, D, E, F, R, SE

The Tax Advantage

MANUFACTURER: Double Eagle Software Inc., 2210 Wilshire Blvd., Suite 875, Santa Monica, CA 90403; (213) 459-9748

HARDWARE REQUIREMENTS: Apple, Atari, Atari ST, C 64/128, IBM PC

PRICE: \$50-\$60

PRICE FOR YEARLY UPDATE: \$36

COMMENTS: Easy-to-use package exchanges data among forms. Many forms and schedules can be printed onto IRS-approved forms. Accepts data from *The Home Accountant*. Computes tax credit with every entry you make. *California Tax Advantage* is available for \$40.

FORMS: 1040, 2106, 2441, 4562, 6251

SCHEDULES: A, B, C, D, E, F, SE

Tax Command Professional

MANUFACTURER: Practical Programs, Inc., 735 North Water St., Suite 704, Milwaukee, WI 53203; (414) 272-7227

HARDWARE REQUIREMENTS: 64K Apple, C 64, C 128, 128K IBM PC

PRICE: \$50

PRICE FOR YEARLY UPDATE: \$25

COMMENTS: This menu-driven program will print directly onto IRS forms. Recalculates your tax owed or refund due each time you make a change. Commodore versions use only 40 columns.

FORMS: 1040, 1040ES (except the Commodore versions), 2106, 2119, 2441, 3903, 8615

SCHEDULES: A, B, C, D, E, F (except the Commodore versions), R, SE

Tax Preparer

MANUFACTURER: HowardSoft, 1224 Prospect St., Suite 150, La Jolla, CA 92037; (619) 454-0121

HARDWARE REQUIREMENTS: 64K Apple, 128K IBM PC

PRICE: \$250 (Apple), \$295 (IBM)

PRICE FOR YEARLY UPDATE: \$75 (Apple), \$95 (IBM)

COMMENTS: Automatically creates many forms and schedules, including an IRS-accepted 1040. Makes calculations speedily. Transfers all information to the corresponding forms and schedules. Automatically completes forms that should be filled out. State supplement for California is available for \$95 (Apple) and \$125 (IBM PC).

FORMS: 1040, 1040ES, 2106, 2119, 2210, 2441, 3468, 3800, 3903, 4562, 4797, 6251, 6252, 8283, 8582, 8598, 8615

SCHEDULES: A, B, C, D, E, F, R, SE



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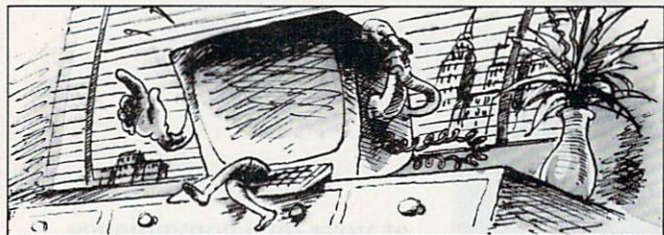
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TELECOMPUTING

GOT MY MODEM WORKING . . . The Editors Pick Their Favorite Communications Programs for Amiga, Apple II, Atari ST, Macintosh, and MS-DOS Computers



Are you looking for a communications program and unsure about which one to buy? Do you simply pick the one with the most features (often the most expensive and complicated to use)? Or do you take home a package that's easy to use and sacrifice a needed function or three?

Finding capable communications software is less difficult now than it was a few years ago. There are several good programs for every computer, and each package delivers certain basic goods for going on-line. For instance, each lets you use XModem error-checking while transmitting data. Each provides you with a method that automates the procedure for logging on to your favorite service or bulletin board. And each allows you to capture text into files or a buffer and then edit it.

So how do you choose one program over another? It's often a question of style. Many programs do the job—but do you like the way they do the job? That's the question we asked ourselves as we compiled this review of favorite communications programs.

AMIGA: DIGA!

The *Diga!* manual's introduction says it all: "If you're new to telecommunicating, you'll find *Diga!* to be very easy to understand and use. If you're a more advanced user, *Diga!* has the power and features you've been looking for."

After several years and many tribulations in using a modem, it's hard to place myself in a novice's position. Without a doubt, new users will encounter difficulties; but working with software and documentation that's clearly presented makes it easy to troubleshoot and experiment.

When starting out, you can simply browse through the segments of

Diga! by clicking the mouse buttons. Later, you can switch to the keyboard if you prefer, using easily remembered keystroke combinations (such as AMIGA-D to dial).

Among the advanced features, one that stands out is Doubletalk. Ordinarily, sending or receiving a file ties up your computer and phone line. What if you want to discuss another matter or talk about the file being sent? In Doubletalk, you can chat on-line with another person while sending a file.

Taking advantage of the Amiga's capabilities, *Diga!* can be customized in numerous ways. The buffer size can be expanded to 512K, depending on the amount of memory in your computer. The number of lines or columns displayed on-screen can be changed to suit your viewing preferences. If you have trouble reading moving text at 80 columns, set the width to 40 columns. If you want to get fancy, you can change the text fonts or color scheme.

The only fault I find with *Diga!* is one that is endemic to most communications programs—setting up automatic procedures is a painful exercise in programming. Who needs it, especially in a program that otherwise requires little more than pressing your index finger down on a mouse button? Except for this fault, *Diga!* is a pleasure to use from its wonderful opening-screen graphics into unseen electronic worlds.

Aegis Development, (213) 392-9972. 512K Amiga, \$80.

—NICK SULLIVAN

APPLE II: POINT-TO-POINT

When I started telecommunicating with an Apple II, I used *ASCII Express*, a versatile but complex old package. It did everything I needed done, but setting up automated procedures was difficult, and I always

forgot the program's commands.

Once *Point-to-Point* (P-T-P) came into my life, however, I never looked back. You control P-T-P through well-organized, AppleWorks-style menus. That's why P-T-P makes it easy to tackle such on-line chores as changing parameters (such as baud rate or local echo), using the text editor, or deleting files from a disk to make room for new ones.

For further ease of use when you're in either terminal or host mode, a menu bar is displayed across the top of the screen. All 10 listed choices are invoked by the OPEN APPLE key and a number. For example, OA-4 loads text into a buffer prior to sending it, OA-6 captures any text scrolling on-screen, and OA-3 starts both XModem uploads and downloads. And when you have to choose a file from disk (say for sending), pop-up windows provide you with a menu of files; just highlight the one you want, and press RETURN.

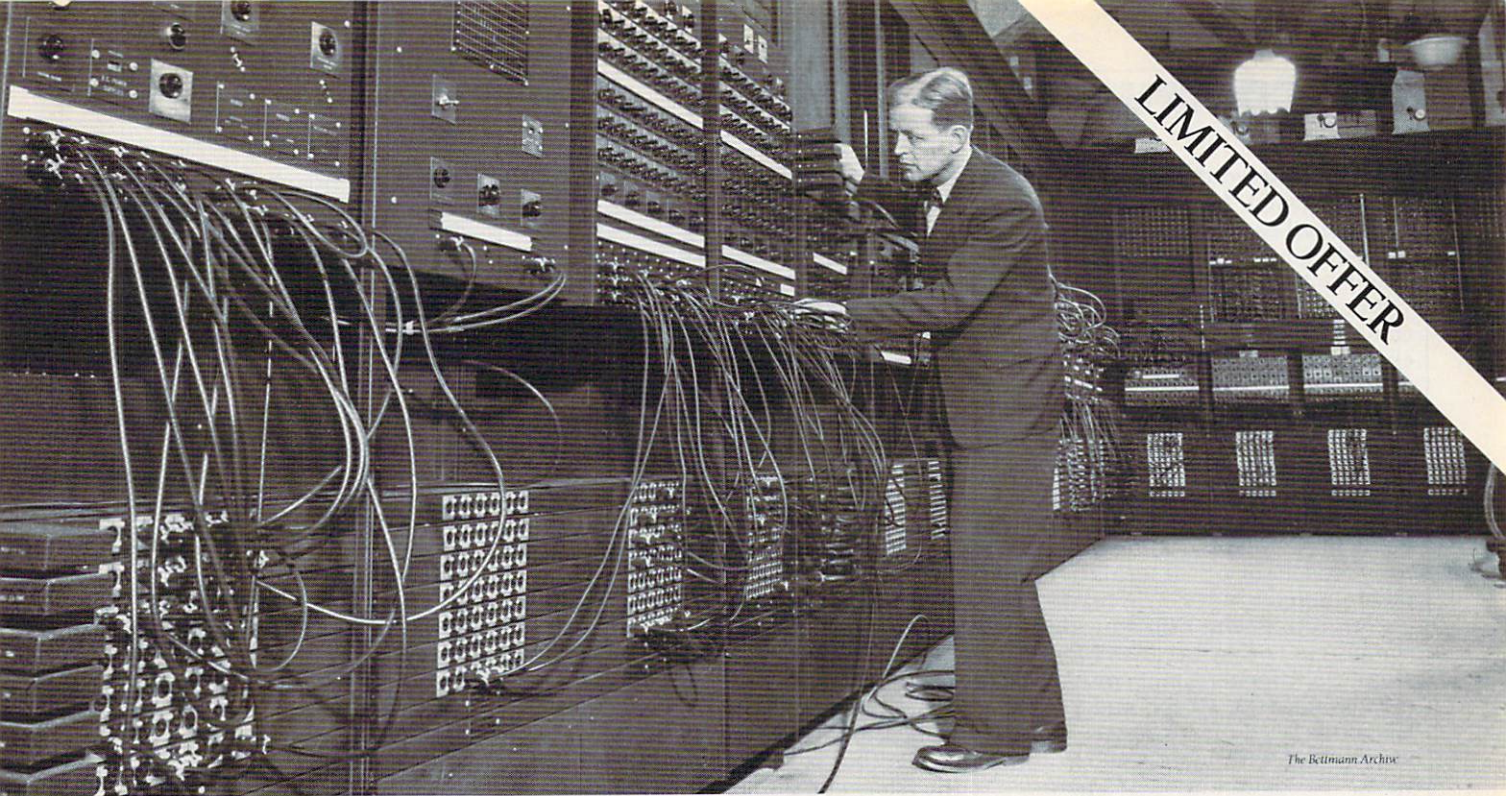
You can automate on-line procedures with P-T-P's macro function, but you have to learn the program's macro codes first. While that makes macros the most difficult part of P-T-P to set up, once created they give you ease of control you couldn't have otherwise. All told, *Point-to-Point* lets you simply "point" to where you want to go and takes you there. And that's why I like it.

Pinpoint Publishing, (415) 654-3050. 128K Apple, \$129.

—DAVID HALLERMAN

ATARI ST: FLASH

Flash is my first choice when it comes to telecommunications programs for the Atari ST. Living up to its name, *Flash* saves lots of time when I send and receive electronic mail or upload and download files. Since the *Flash* program includes a



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TELECOMPUTING

built-in GEM word processor (with cut-and-paste), I can compose electronic mail easily, without the hassle of loading a separate word-processing program.

When I'm ready to dial another computer, I can call upon one of my custom-made "DO" files to perform all of the work for me. DO files are those composed of a programmable "script" language that can give the computer instructions for dialing a number, logging on, browsing through recent messages and files, uploading or downloading files (using XModem or ASCII format), and much more.

Connecting with different kinds of computers is easy because *Flash* supports three terminal emulation modes—VT-100, VT-52, and Vidtex. VT-100 is used mostly for telecommunicating with mainframe hosts; VT-52 (the default mode) is perfect for most telecommunications, including ST to ST; while Vidtex is for use specifically with CompuServe graphics such as weather maps, digitized photographs, and computer art. In Vidtex mode, these high resolution graphic images, called "RLE" graphics, can be saved to disk in DEGAS format for later viewing or updating.

One additional aid for talking to other computers (including Commodore 64 and Atari XE) is the Translation Table feature found in *Flash*. Translation lets you selectively change the text input or output by specifying which character will replace others. For example, the Atari XE doesn't use a standard carriage return; instead it uses the ASCII character 155, which appears on the ST as a cent sign. When receiving an XE text file, you can translate the incoming text by replacing the cent sign with a carriage return.

Flash has the speed, power, and versatility to take care of most telecommunication requirements with ease. Its features are so well thought out that I wish I had a version of *Flash* for every computer I use.

Antic Software, (415) 957-0886.
Atari ST, \$30.

—JOEY LATIMER

MACINTOSH: MICROPHONE

I like the way this straightforward package's Watch Me mode records any actions I perform on-line, saves those actions into a "script," and replays them with a single command whenever I need them again. This

saves me time and helps me avoid the frustration and error of programming my own automated sequences. Furthermore, I like the way that a single command can be invoked by either choosing from a pull-down menu, using a keystroke command (such as COMMAND-M), or pressing an on-screen button. And I'm absolutely delighted about the sophisticated scripts—beyond the ken of the Watch Me mode—I can create now that I'm an experienced *MicroPhone* user. I simply choose the scripts' lines (such as Dial Service or Wait For Text) from a scrolling menu and then fill in the necessary phone number or words. I have 42 scripts in my master on-line file—and room for more.

When I'm sending or receiving data, *MicroPhone* puts a window on-screen that lets me know which disk the file is going to or coming from, how much of the file has been transmitted, and how much time is left to finish the transfer. When the file transfer is complete, *MicroPhone* makes the computer beep twice, alerting me even if my attention is elsewhere (which it often is when the computer is tied up transmitting data).

I notice that *MicroPhone* saves me time by automatically capturing text into a file that's compatible with my word processor. Should I change to a new word processor, I can change *MicroPhone*, too, so that the files it captures are automatically compatible with the new word processor. I don't mind that the on-line text editor is only adequate, because as a desk accessory, I can replace it with my favorite desk-accessory text editor, the shareware *miniWriter* (Maitreya Design). There's a lot that's attractive about *MicroPhone*.

Software Ventures Corp., (415)
644-3232. 512K Macintosh, \$149.

—DAVID HALLERMAN

MS-DOS: PROCOMM

ProComm is designed for people who use their modems every day. It's a fast, fluid program that is "invisible" most of the time, until you want to do something special. Then *ProComm* steps up and presents a solution you can effect by quickly tapping a few keys.

Beyond its speed, what I like most about *ProComm* is its almost infinite flexibility. Any number of things can go wrong with on-line communications, and many programs leave you

high and dry. Sometimes you have to turn off the computer, disconnect the phone, and try again; other times, not even that works. *ProComm* gives you every chance to solve the problem while on-line and salvage the session. For instance, you can switch parameter settings (parity and baud rate, for instance) while on-line. You can scroll through a file to make sure it's the one you want to send. And its XModem file-transfer protocol has "normal" and "relaxed" modes, the latter designed to be used with systems, such as CompuServe, which are sometimes slow to respond to your prompts.

When talk-typing with another person on-line, you can activate a CHAT box at the bottom of the screen where your comments appear. Since your typing and comments are separate from the other person's (in the top part of the screen), the words don't become all jumbled as they do when using most communications programs.

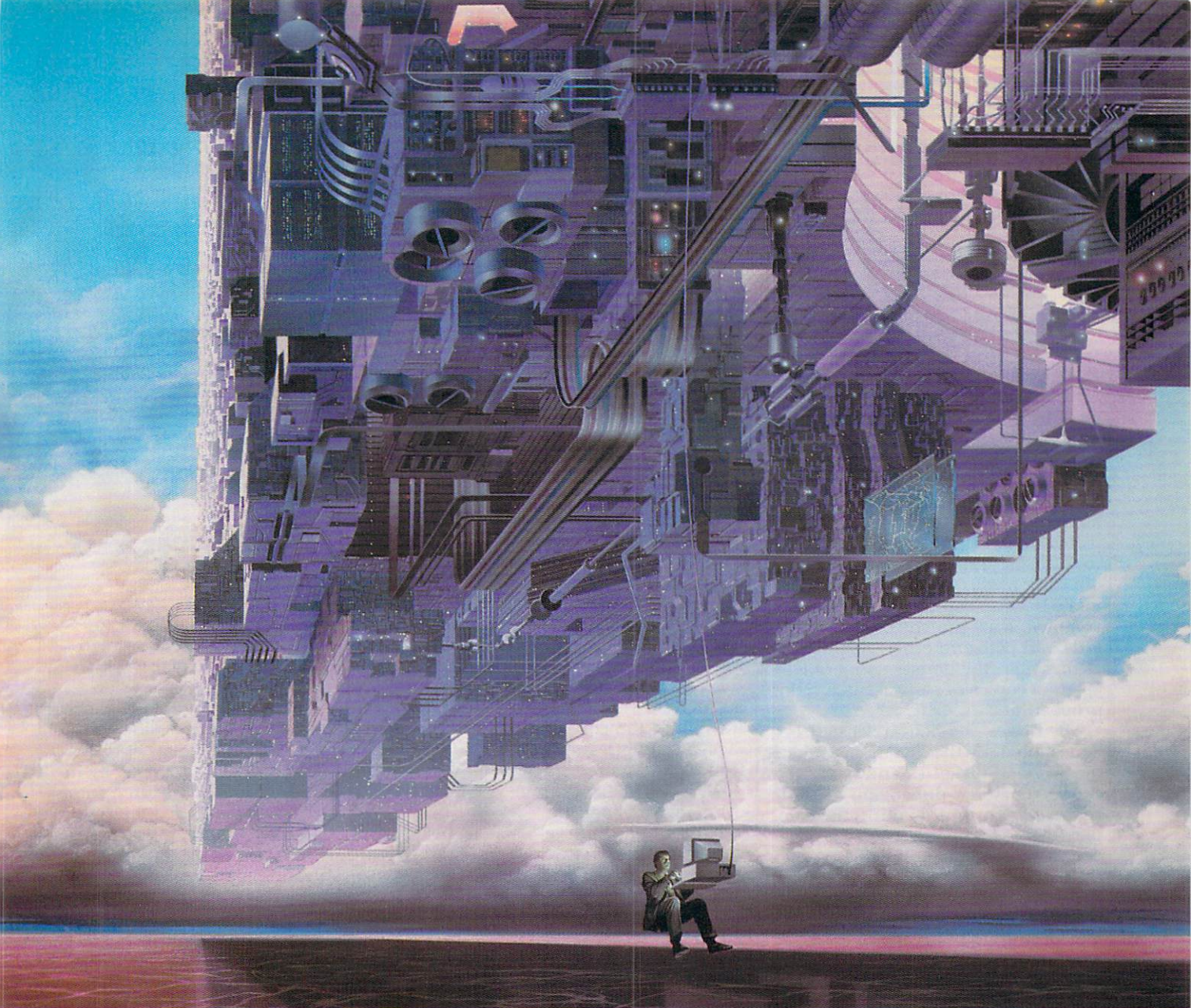
Another feature I use often is REMOTE HOST. With a simple command (ALT-Q), my computer is ready to receive a call and accept a file from an outsider. I can leave the room or the house. If I've given the person the proper passwords, he or she can even obtain a listing of the files on my hard drive and download them.

Virtually every task is accomplished with a two-keystroke combination. For instance, ALT-D gives you the dialing menu. ALT-P lets you switch parameters. Not all of the commands are quite so mnemonic, however. The command to activate the printer is ALT-L. If you forget that, as I have several times, you can get a quick list of all commands by typing ALT-F10.

What I like least about *ProComm* are the "command files" needed to automate a sign-on procedure (or any other procedure). The documentation that describes how to program them is opaque, and I consider it sheer luck when the files work the way I want. Why can't *ProComm* record a sequence as you sign on to a system, then replay it again and again? Other programs do that. So, there's room for improvement—but not much.

Datastorm Technologies, Inc.,
(314) 474-8461. 128K IBM PC and compatibles; \$35 to register, \$50 to register and receive documentation.

—NICK SULLIVAN ■



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APPLE

BY CHARLES H. GAJEWAY

APPLE II

An Apple II system is not quite complete without Central Point Software's *Copy II Plus* (\$40) disk utility. *Copy II*'s capability to handle almost any kind of disk operation in both DOS 3.3 and ProDOS, plus its ability to copy almost any copy-protected disk, make it one of the most used disks in my collection. Issues of piracy aside, you have the right to make backup copies of any software you own, copy-protected or not; with kids and pets and other disk-hostile elements in the house, using only original copies of software is a risky proposition.

The newest version—release 8.1—is designed for the IIGs and can handle 3.5-inch diskettes and hard drives. This new dimension is extremely important, making the complexities of managing two or more operating systems and three types of disk storage a simple matter of making a few menu choices. If you already have *Copy II Plus*, do yourself a favor and upgrade. If you don't, what are you waiting for?

Graphic Word Processor. If you have a printer that can do high-resolution graphics, an interesting acquisition would be StyleWare's *Multiscribe Desk Accessories* (\$40), a word processor that uses Macintosh-like fonts to create striking documents. Additional fonts are available, as is the *Picture Manager* utility (also \$40), which allows graphics to be placed anywhere within a document.

MACINTOSH

I think *HyperCard* is an amazing tool, but after experimenting with it a bit, I have discovered a few drawbacks. First of all, *HyperCard* is a hungry program, requiring a lot of memory and a lot of disk storage. It needs at least 1MB of RAM to run and at least two 800K floppies.

Second, *HyperCard* is somewhat unstable under *Switcher* and, when used with *MultiFinder*, leaves very little usable memory in a 1MB Mac.

One of the things *HyperCard* does extremely well is store and retrieve frequently used data. But if you can't get at that data while you are in an application, it doesn't do you much good.

Stackware's New Interfaces. Third, *HyperCard*'s HyperTalk is a powerful, easy-to-learn programming language for the Mac. But the stackware applications designed with HyperTalk tend to bypass the standard Mac operating system, allowing—and even encouraging—users to create their own interfaces. In my opinion, this isn't good. For instance, the traditional menu bar across the top of the screen, which every Mac user looks for after booting up, doesn't appear in much of the new stackware. One of the true strengths of the Macintosh has been its simple and consistent user interface, a strength that will be diluted if more and more complex and powerful stacks with non-Mac operating features appear.

I still think that every Mac owner should have *HyperCard*. But don't expect it to solve all your problems or even replace your favorite applications; use it to fill in the gaps and make life easier.

Print Labels Easily. Mailing labels, video or audiocassette labels, name tags—anytime you want neatly printed self-sticking labels, you face an arduous, teeth-grinding task, even with continuous-form stock. I found the Mac was the worst of all computers for performing such tasks, because of its nonstandard line spacing and proportional typefaces.

But all of that is history with *Silicon Press* (\$80) from Silicon Beach Software. This print utility program makes doing a run of labels an easy task.

The label design can be anything from a tiny circle to a full page. Data files can be typed directly or generated by any database or word-processing program capable of creating a text-only file (the program can also work directly with *OverVUE*).

Silicon Press is good, but it isn't perfect. There should be rulers in the page-layout window to aid with fine placement, especially when using a LaserWriter. And when you

print a merge list with a multiple-label layout, you must keep your label design within the print boundaries, otherwise a print error will hang the program. Nonetheless, I find *Silicon Press* indispensable.

CHARLES H. GAJEWAY can be reached on CompuServe (ID: 73357.3577) or on GEnie (ID: C GAJEWAY).

ATARI

BY DAMON OSGOOD

In a radical switch from its traditional video game and small micro business, Atari is hard at work on Abaq, a high-speed, high-performance workstation, which is expected to cost about \$6,000. The heart of Abaq is a relatively new chip called the T800-20, developed by Immos Corporation. Perihelion Company of Great Britain is developing the system hardware and software. According to Atari, the T800-20 is considerably more powerful than the Intel 80286 chip used in the IBM PC AT and IBM PS/2 Models 50 and 60.

One workstation can contain as many as 13 chips. Abaq has three external links to connect to other workstations, allowing for a local area network (LAN) that can grow as your needs increase.

The Abaq system will operate at a blazing 10 million instructions per second (MIPS) and is expected to be used primarily for video production and secondarily for engineering and scientific applications. It can display 16 colors in high resolution from a palette of 16 million. The system will run under a Unix-like operating system. When will you see Abaq, if ever? With Atari, you never know.

PC-ditto. *PC-ditto* (Avant-Garde Systems; \$90), mentioned last month, is an IBM emulation program for the Atari ST series. With *pc-ditto* installed, you can run 99 percent of existing IBM software, including such titles as *Lotus 1-2-3*, *Flight Simulator*, and *XyWrite*. Emulation is nearly flawless, even down to identical error messages and IBM fonts, but programs do run a bit

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MACHINE SPECIFICS

slower than on a normal IBM compatible.

The new version, 3.0, boasts hard-drive support, Atari clock-calendar support, and compatibility with the Microsoft Mouse and other mice. It works with any ST configuration, though if you have MS-DOS software in 5.25-inch format, you'll need a 5.25-inch disk drive.

Earlier versions of *pc-ditto* didn't support monochrome systems, but version 3.0 corrects this. Also, *pc-ditto* runs best with a double-sided disk drive, allowing the full 360K formatting that an IBM permits, but it can be used on a single-sided system, only allowing 180K per disk. High-capacity disks can be used, allowing at least 1.2MB per disk.

EDITOR'S NOTE: *Damon Osgood, one of the original K-POWER software reviewers, is now an undergraduate at the State University of New York at Albany.*

Next month, Matthew Stern will take over the Atari column. John J. Anderson, who has written the column since it started, now contributes to the monthly HyperCard department.

COMMODORE

BY SHAY ADDAMS

GEOS, the operating system that adds a window-and-icon interface to the C 64, has finally made it to the C 128. The 128, which can include a 1571 drive capable of accessing both sides of a disk, provides a much more practical home for GEOS. On the 64, GEOS is too slow for serious business users. The 1571 drive also has twice the storage space as the 64's 1541 drive. (The 128D's built-in drive is a 1571.) GEOS128 is really supposed to zoom when run from a RAM disk created with Commodore's 512K RAM Expansion, but I haven't yet tried this Bonneville speed test.

GEOS128, from Berkeley Softworks, also supports the 1541 drive. Thus, 128 owners who have 1541 drives can use GEOS128 immediately and gradually build more powerful systems by adding 1571 drives, extra RAM, and better monitors.

GEOS128 Software. When using an 80-column monitor, you'll find that word processing and working with spreadsheets are much more practical with GEOS128 than with GEOS64, which only supports a 40-column display.

With GEOS128, you get the all-new *geoWrite Workshop*, improved versions of *geoWrite* and *geoPaint*, seven fonts that can be used in either, and a batch of pull-down desk accessories. Other programs are on the way, including beefed up versions of *geoCalc* and *geoFile*. With GEOS128's 80-column capability, extra speed, and 1571 drive support, the 128 is an even more viable choice for business users.

You'll need the Commodore 1351 Mouse or a joystick to use GEOS128.

Infocom 128. Infocom's Interactive Fiction Plus line, including games such as *Beyond Zork*, requires too much memory for the 64 and can only be played on the 128 and Amiga. But Infocom says it'll no longer release all games on the Amiga—only the ones that can use the machine's advanced features. That means the only Commodore computer capable of running all Infocom games is the 128, which is coming into its own in the realm of entertainment, as well as in business.

SHAY ADDAMS, editor and publisher of *Questbusters*, an adventure-game newsletter, can be reached on CompuServe (ID: 72267,601) or on QuantumLink (ID: JBCHALMER).

IBM

BY HENRY BEECHHOLD

It looks as though it won't be too long before the new PS/2 Micro Channel Architecture becomes a new standard in microcomputer design. Reportedly, negotiations are under way between IBM and several major chip manufacturers to allow them to develop chip sets compatible with the PS/2 design. (However, IBM denies this.) If and when that happens, full-fledged PS/2 clones will quickly follow. So here we go again!

A Million PS/2s Shipped. IBM announced that it shipped more than a million PS/2 systems by November 1987. That sounds impressive, but trade papers say about half were Model 30s, which, along with the Model 25s, were not much more than repackaged PC XT's. These low-end PS/2s don't use the Micro Channel bus structure or VGA color graphics, which, together, give the PS/2 line its real distinction.

Meanwhile, demand is growing

rapidly for the PS/2 Model 50 (see "Solving the IBM-Compatibles Puzzle" in this issue), a no-nonsense 80286 computer that does use the Micro Channel and VGA graphics. Model 50 deliveries are falling considerably behind orders—a fact that IBM doesn't deny.

Track It Down. There are any number of programs on the market for setting up electronic Rolodexes. In fact, any general-purpose database manager will do the job nicely. But suppose you don't need a full-blown database management system (DBMS), yet would like to have an easy way to create a fast-access Rolodex that will allow you to search, sort, and report on up to eight of 15 fields; to access external databases if necessary; to auto-dial phone numbers; to add an almost unlimited number of date-stamped "stick-on" notes to any card in the file; and to customize the card format to suit any database you wish to create.

Tracker (Adaptive USA Inc.; \$99), which can be run in either memory-resident (instant pop-up) or non-memory-resident mode, was named by its Australian developer after the famed Australian aboriginal trackers; a photograph of one of the hunters appears on the disk cover.

HENRY BEECHHOLD is the author of *The Brady Guide to Microcomputer Troubleshooting & Maintenance* (Brady Books, Prentice Hall Press, New York).

MS-DOS

BY STEVE MORGENSTERN

Microsoft, the creator and publisher of MS-DOS, has introduced an on-disk training course for mastering MS-DOS's intricacies. Called *Learning DOS* (\$50), the package consists of separate lessons for floppy-disk and hard-disk drive owners and a quick reference disk that offers subject-related help when called from the DOS prompt. The lessons are well paced and presented and include practice opportunities.

Here are two interesting tips from *Learning DOS*:

- Before performing a wild-card delete (such as `DELETE *.TAX`), which will delete all files with `TAX` as the file-name extension, first ask for a directory using the same wild-card setup (`DIR *.TAX`, for example). This maneuver will provide you with a list of all



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MACHINE SPECIFICS

files that fit your wild-card specification and prevent you from deleting files you want to keep.

• If you want to redisplay the last DOS command you entered (to correct a misspelling or execute the command again, for example), just press the F3 key.

Notes to Yourself. Database management software is great for handling well-organized information, but what about stuff that's just . . . well, stuff. Notes to yourself. To-do lists. Titles of articles you want to read when you get a chance, or movies you want to rent, or people whose birthdays are coming up soon. Broderbund has a program called *Memory Mate* (\$70) that's ideal for keeping and retrieving information that hasn't been filed by category.

The memory-resident program indexes every word of every note you enter. That means you can search for anything that sticks in your mind—a name, a phone number, the date you wrote a note, whatever (as long as the item you're searching for is no longer than 73 characters)—and the program quickly finds all matching information. You can easily cut and paste information between *Memory Mate* and your application software.

STEVE MORGENSTERN can be reached on CompuServe (ID: 72545,606).

TANDY

BY STEPHEN MILLER

TANDY 1000

Because I constantly edit my writing while on the run, I tend to switch machines a lot—TX to portables (102 and 1400LT), portables to HX, and so forth. With all this, I need to keep track of the latest revision of a file. One way to accomplish this in MS-DOS machines is to make use of the resident MS-DOS program's date and time functions that stamp the date and time on files when they're saved. All this is wonderful—except that on the Tandy machines, the date and time you type in are stored in RAM and automatically updated as long as the power is on; when you turn off the computer, however, MS-DOS forgets the date and time. You have to reset them each time you boot MS-DOS.

The solution to the problem is a clock/calendar on an inexpensive

chip called SmartWatch (Cat. #25-1033; \$40). SmartWatch is user-installable. (I did it and only had to straighten one pin!) Now I don't have to manually type in the time and date every time I power up; SmartWatch tells me the date and time automatically and indicates the time I saved a given file.

COLOR COMPUTER 3

The increased graphics and color capabilities of the Color Computer 3 have started to generate a number of drawing or graphics programs to rival the famed CoCo Max cartridge. Now even Greg Zumwalt and Steve Bjork, the prolific CoCo programmers who are responsible for some of the more popular CoCo software, have entered the graphic arena.

Color Computer Artist. Bjork's *Color Computer Artist* (Cat. #26-3277; \$30) is likely to generate the most interest because it's a fun, easy-to-use program with all the normal computer drawing tools. It works best with a color mouse or a high-res joystick, but you can use the keyboard and produce effective pictures. I'm not an artist, so my efforts were, shall we say, less than spectacular? Nevertheless, the colors on an RGBI monitor were alluring.

Phantomgraph. Zumwalt's *Phantomgraph* (Cat. #26-3276; \$40) is a presentation graphics program. Its function is to produce graphs and charts for business presentations. Requiring a full 128K, *Phantomgraph* really makes use of the CoCo 3's graphics muscle. If you are already using your CoCo to run any of the popular CoCo spreadsheet programs, such as *DynaCalc* or *VIP Calc*, then *Phantomgraph* can use that statistical data you've already created to illustrate your financial projections. Unlike *Computer Artist*, *Phantomgraph* can be effectively used by nonartists. I was able to turn out some spectacular pie charts and colorful bar graphs.

STEPHEN MILLER is a computer consultant and journalist.

ORPHANS

BY PATRICK SPERA

Genial Computers has released *PC Transfer* (\$25), which allows a TI-99/4A or Geneve system to read, write, and format an MS-DOS disk. You

could work on your IBM clone at the office, bring home your working disk, and finish the job on your TI. I like that idea.

Alpha-One Adam. No, it's not a police show. Alpha-One-Computers is a die-hard Adam dealer with a diverse supply of Adam software and peripherals. For \$10 you can purchase *The Best of Broderbund*, a package that includes A.E. and the classic game *Choplifter*. For the home office, you might like *MicroWORKS* (\$25), a combined spreadsheet, database, and word processor.

Sinclair QL. Never really popular in this country, the Sinclair QL does have a tight core of loyal users. Alpha-One also carries a selection of supplies for the QL enthusiast. As with most Sinclair computers, the keyboard is the weak point. Enter the Schon replacement keyboard (\$89). You can replace the flat-key European-style keyboard with a regular one. Installation is quick, but there have been reports of key-bounce problems.

Adios!

EDITOR'S NOTE: Patrick Spera, an aircraft technician and computer tinkerer who has supplied this column with wit and information since it began, has been transferred by his employer to Saudi Arabia. We hate to see him go, wish him luck, and hope the desert doesn't do in his trusty Timex.

Patrick of Arabia's disappearance also marks the end of the Orphans column. With new machines coming on the market daily, and many orphan owners upgrading, it makes sense to allot more space to companies still active in the marketplace.

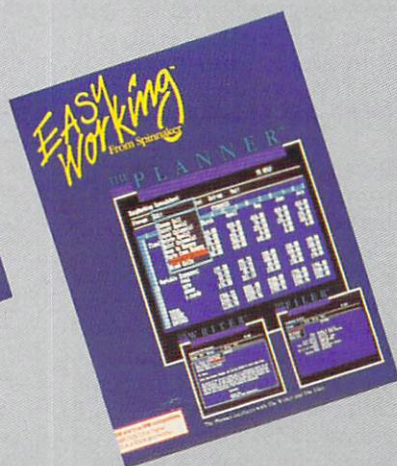
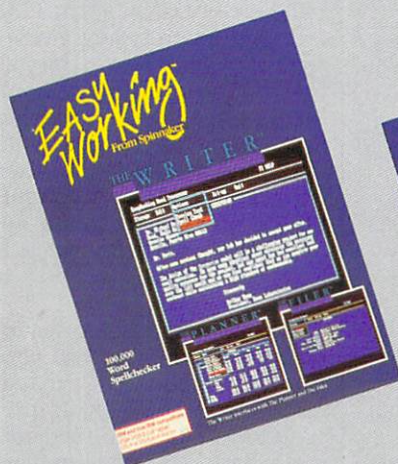
However, we encourage all Timex and Adam fans to turn on their modems and tune in to the Computer Club Forum on CompuServe (GO CLUB)—TI users should go to the TI FORUM—where they'll find an active user community and all the information they'll ever need to keep their computers humming.

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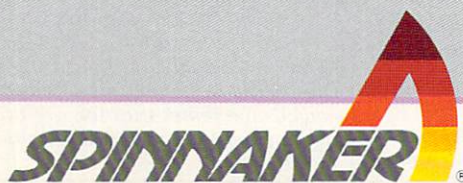
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WHAT'S IN A NAME? A BUSINESS!

How to Create a Family Newsletter for Fun (and Profit)

BY RALPH BLOIS

I am working on my first million—names, that is, not dollars! When I started researching my family history in 1980, I knew of only 14 people with my surname; today I have a list of more than 20,000 names in the Blois family (many with different surnames from marriages) and have produced more than 40 issues of a Blois family-name newsletter.

FOR LOVE OR MONEY—OR BOTH?

I publish my family newsletter just for fun—anyone can do it, and there's potential for turning a profit, too. With your computer, a printer, an office copier, and plenty of elbow grease, you're in business. My own interest is in learning more about my family—not in making money from it—so I charge \$1.50 an issue and break even. To show a profit, I'd have to charge anywhere from \$2.50 to \$5 a copy. Your name is almost certain to be more popular than mine; if you're a Smith, you have thousands of potential subscribers, but there are only a couple of hundred Bloises. You may not make a fortune, but the investment is small, and you'll get a great deal of satisfaction from what you'll be doing; you'll be helping others in your family learn about themselves and their background.

THE SETUP

My hardware includes an Apple II. Plus, a letter-quality Transtar 120 printer, and a Savin 775 office copier. All three are virtually trouble-free. I use *Word Handler* and *List Handler* (both by Advanced Logic Systems). Really, all the software you'll need is a good word processor and a database, and these exist for just about every computer. Although I haven't found the need for fancy graphics, graphics and desktop-publishing software are available (see "A



Ralph Blois, of Beaverton, Oregon, created *The Blois Voice*, which he mails to his relatives.

Guide to Desktop Publishing in the November 1987 issue, or ask your software dealer for suggestions) for the Macintosh, IBM and compatible computers, and others.

First, you must establish a filing system using your database program and start gathering information—everything you can find on your family surname. Genealogical research can be done at your local library, and some communities have genealogical support groups that can guide you in your search and help you make the best use of your computer. For starters, contact your relatives for personal histories, making certain to file everything—either on paper or on computer disks, whichever you find easier. You will need a bank of information from which to draw for your newsletter.

Next, you need a mailing list. That's where list-handling software is needed. With *List Handler*, I am able to put more than 1,500 names and addresses onto one disk with space to spare. Where do you get a list of names? Back to your public library again! Most public libraries have shelves of telephone directories for major cities—mine has more than 100 such books for different locales. I made a list of names and addresses of every Blois I could find nearby—all 120 of them.

THE PRODUCTION

Now, begin preparing your first issue, compiling anecdotes and other interesting items that you've collected in your files. I mailed the first issue of *The Blois Voice* (yes, it rhymes!) for no charge, to every per-

son on my list. The issue included a funny story about a Blois toddler on a train with a "Do Not Feed" sign on his back because he got indigestion from too much candy given to him by passengers; a sad story about a Blois pioneer returning home to find his wife dead and a newborn child to look after; one telling why my wife and I had started the newsletter and what we wanted to accomplish; plus several other short items, some funny, some newsy—six pages in all. Keep the stories short and concise, and stick to the point.

Type in and edit stories for your newsletter using a word processor, then print them, cut them apart, arrange them in a logical, interesting sequence, add headlines and paste them onto 8.5-by-11 inch art boards. Add some clip-art or photographs, a title or logo, an issue date, and your return address, make copies, and the newsletter is ready. We included a subscription blank, a one-page questionnaire for genealogical data, and a request for more names, addresses, and family stories.

THE PAYOFF

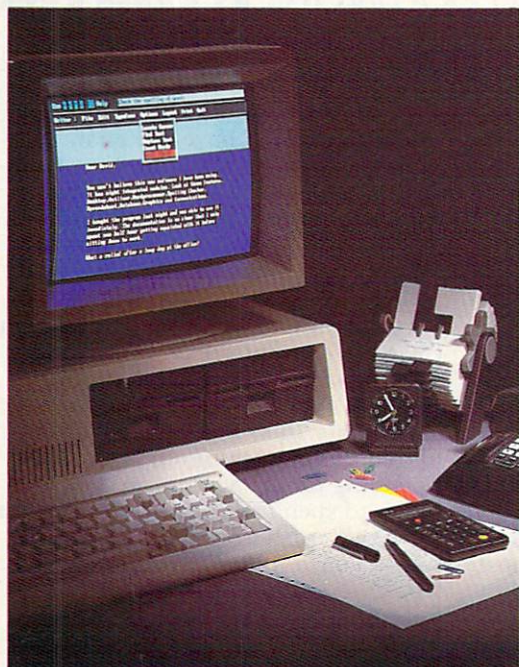
The rewards from this project are more than material. We've reunited families, found missing relatives, and inspired many to study family history—and we in turn have been inspired by the sense of "family"—which was especially evident at our first family reunion (nearly 400 attended). Perhaps you would also find pleasure in publishing a newsletter just for your family. ■

HAVE A QUESTION? WHAT'S YOUR STORY? LET US KNOW!

This is your column. Please send your questions or profiles of your family's computing activities to: FAMILY & HOME-OFFICE COMPUTING, Family Computing Department Editor, 730 Broadway, New York, NY 10003. Profiles should be three to five pages, typed or printed, and double-spaced. If your family's profile is selected for publication, we'll send you a software package for your computer. Due to the large volume of mail received, we regret that we are unable to acknowledge or return unpublished submissions.

RALPH S. BLOIS, a retired advertising executive, runs St. Clair Communications from his home in Beaverton, Oregon. He offers creative art, copywriting, and photographic services to clients and is author of a book on corporate in-house advertising.

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EDUCATION

SOFTWARE TO RAISE SAT SCORES

How *Barron's Computer Study Program for the SAT* Helped One Student Earn a Scholarship

Plus: A Roundup of SAT-Preparation Software **BY KAREN KANE**

When Duane Kilgus, of Cary, North Carolina, received the results of his first attempt at the Scholastic Aptitude Test, he was concerned that his combined 880 score, out of a possible 1,600 points, wasn't high enough. Even though his high school grade point average was an impressive 3.6, and he was active in many extracurricular activities, Kilgus knew that a low SAT score could ruin his chances for admission to and scholarships from the colleges he was hoping to attend. For many students and their parents, the concern over SAT scores is a real one.

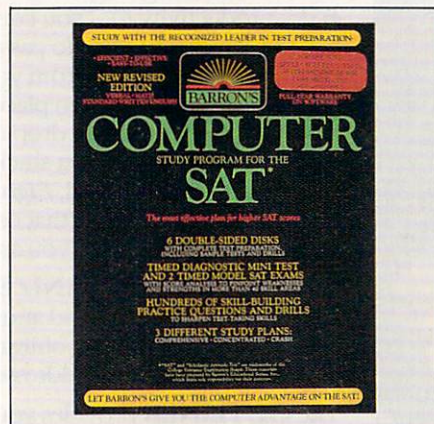
WHAT IS THE SAT?

The SAT, a test that most college-bound students must take during high school, is a timed, multiple-choice examination with six half-hour sections: two verbal, two mathematics, one Test of Standard Written English (TSWE), and one experimental section. According to the College Board's 1986 Annual Survey of Colleges, about 73 percent of the four-year colleges and universities in the United States use SAT scores in conjunction with high school academic records to predict college performance. Even though a high score can offset a weak academic record, a less-than-stellar SAT score can land even the brightest student's application in the rejection pile. The fact that one three-hour test could hold more weight than a 12-year academic career is enough to worry anyone.

To help ease SAT jitters and raise scores, many students enroll in test-preparation classes, hire private tutors, cram for the exam with drill-and-practice workbooks, or practice with one of the many computer programs designed to familiarize students with the SAT format.

BARRON'S SAT PROGRAM

The best-selling *Barron's Computer Study Program for the SAT*



Duane Kilgus's choice for improving his SAT score.

(Apple, 128K IBM PC, and 128K Macintosh; \$50) is one of the most logically organized and thorough SAT-preparation computer programs. For this reason, Kilgus's father selected it to help his son prepare for his second attempt at the test. The program has three sample tests designed to reflect the SAT's form and content. There is a short diagnostic test and two complete model SATs that each contain a verbal section, a math section, and a TSWE. Your score on each of these tests is given as an equivalent SAT score. In addition, each section is divided into skill areas, such as analogies in the verbal section or geometry and inequalities in the math section. Performance in each skill area is analyzed to pinpoint strengths and weaknesses.

Testing Mode. Each of these tests can be taken in a timed testing mode or in a learning mode where the answer to each question is explained. The testing mode is meant to parallel the real SAT's. You are given a half hour for each section and cannot continue once your time is up. You may skip questions and return to them or change any answer as time allows. Two timers appear on the screen for each question: One is a pacer that serves as a guide to indicate how much time you should spend on a specific question, and the other is a clock that indicates

how much time you have spent on the test so far.

Learning Mode. The learning mode is untimed. You have two chances to answer each question, and the computer provides hints and explanations for each response you give. Even if you answer a question correctly, the computer explains the answer.

Once you have an idea of what you need to concentrate on, you can turn to the practice exercises for each of the different skill areas.

Flexible Study Plan. Barron's suggests three different study plans depending on the amount of time you plan to spend with the program—the two-day crash program, the two-week concentrated program, or the 10-week comprehensive plan. The program is very flexible, however, and designed so that you can focus as much or as little time as you like on any area you choose.

Because Kilgus was most interested in pursuing a science-related course of study in college, he decided to concentrate only on the math drills provided in the package. He spent between 10 and 15 hours per week working with the program during the summer between his junior and senior years at Cary Senior High School. Kilgus believes that the Barron's program helped him more than anything else could have. "I had fun using the computer to study, and I wouldn't have used a book as diligently," explained Kilgus. He especially liked the feedback the program gave.

Helpful Manual. Kilgus also found the study hints and strategies and the mathematics facts and formulas in the manual very helpful. The manual clearly explains what to expect from the SAT. The different types of questions are presented with the instructions that you're likely to find on the real test, followed by a strategy for avoiding common pitfalls. Basic math formulas needed for the math section and a list of vocabulary words, prefixes, suffixes, and word roots are also in

KAREN KANE is associate editor for FAMILY & HOME-OFFICE COMPUTING.

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In the first Module, for example, when your sample program (Declining Interest Loans) appears on your screen, you'll find errors on certain program lines. You'll also see that the program is only three-quarters completed.

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EDUCATION

the manual. By the time Kilgus had read the manual and gone through nearly all of the program's math exercises and tests, he felt totally prepared to retake the SAT.

THE PAYOFF

His study efforts paid off. Kilgus's math score increased 120 points (his verbal score remained unchanged), which brought his total

score up to 1,000 points. His improved score not only helped him get into Campbell University in Buies Creek, North Carolina, but it also earned him a Presidential Scholarship for \$1,500 per year. Kilgus is now enjoying college life and studying such science courses as chemistry, physics, and biology, in hopes of being accepted into the university's pharmacy school. ■

THINGS TO LOOK FOR

Barron's Computer Study Program for the SAT is just one of the many programs on the market designed to help students prepare for the Scholastic Aptitude Test. For the most part, these programs are several years old and have proven track records. Even though each package has a slightly different way of presenting the material, there are several basic features that any SAT preparation package should include. Below is a list of things to look for in an SAT program.

- Stand-alone manual with formulas, glossary, and test-taking strategies
- Several types of tests
- Format similar to the actual exam (timed, option to skip questions and return to them later, for instance)

- Review of correct and incorrect answers with explanations of both
- Logical subdivisions of topics for both verbal (analogies, sentence completion, vocabulary, and reading comprehension) and math (geometry, quantitative comparisons, fractions, decimals, ratios, and word problems) sections
- Reliable scoring system that combines data from several practice tests and offers proposed study plans (highlights strengths and weaknesses)
- Numerous exercises to avoid repetition
- Feedback and helpful hints during practice
- Option to save work at any time
- Adaptability to student's needs and time limitations

SAT SOFTWARE FOR GETTING AHEAD

The following programs are among the best packages available for SAT preparation. They contain most, if not all, of the features listed in "Things to Look For."

Program and Manufacturer	Machine Compatibility/Price	Comments
<i>Barron's Computer Study Program for the SAT</i> Barron's Educational Series 250 Wireless Blvd. Hauppauge, NY 11788 (516) 434-3311	Apple, 128K IBM PC, 128K Macintosh; \$50	Three different study plans (10-week comprehensive, two-week concentrated, and two-day crash). Well-written manual.
<i>Beat the SAT</i> Spinnaker Software One Kendall Square Cambridge, MA 01239 (617) 494-1200	64K Apple, Atari, C 64/128, 128K IBM PC, 128K Macintosh; \$40-\$100	Optional feedback mode, 1,000-word on-screen dictionary. No Test of Standard Written English or math formulas.
<i>Computer Preparation for the SAT</i> Harcourt Brace Jovanovich 1250 Sixth Avenue San Diego, CA 92101 (619) 699-6726	64K Apple, 128K IBM PC; \$40	Questions appear in book, and students fill in on-screen answer sheet. Includes 1,000 on-screen flash cards. Explanations of answers could be clearer.
<i>Lovejoy's Preparation for the SAT</i> Simon & Schuster Software One Gulf + Western Plaza New York, NY 10023 (201) 767-5937	64K Apple, C 64/128, 128K IBM PC; \$50-\$60	Includes on-screen scratch pad and calculator. Comes with <i>Lovejoy's Concise College Guide</i> . Screen display and program manipulation could be simpler.
<i>Owlcat SAT Preparation Course</i> Digital Research, Inc. 60 Garden Court Monterey, CA 93942 (408) 649-4343	Apple, C 64/128, IBM PC; \$90, 15-hour package; \$250, 60-hour package	Includes an electronic dictionary, on-screen manual, SAT game, and problem-solving advice for practice questions.
<i>The Perfect Score: Computer Preparation for the SAT</i> Mindscape 3444 Dundee Road Northbrook, IL 60062 (312) 480-7667	Amiga, Apple, C 64/128, 128K IBM PC, Macintosh; \$70-\$80	There are 100 questions for each topic covered by the SAT.

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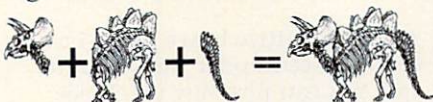
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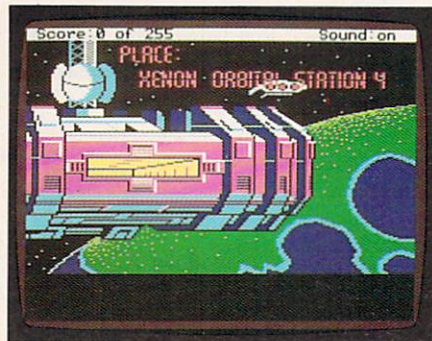


ENTERTAINMENT

HINTS, NEWS, AND NEW GAME FORMATS

NEWS AND RUMORS

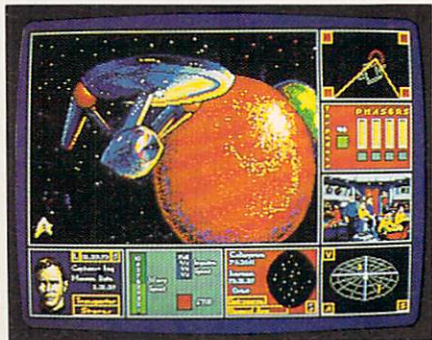
★ **Sierra On-Line's** latest unveiling is *Space Quest II: Vohaul's Revenge*, the sequel to *Space Quest: The Sarien Encounter*. Join the ongoing adventures of our favorite sanitation-engineer-turned-space-hero, **Roger Wilco**, as he encounters new



Roger Wilco returns in *Space Quest II*.

disasters on the trail of the sinister scientist **Sludge Vohaul**. A comic book is part of the package and adds to the humor. The game (\$50) is for the **Amiga, Apple IIgs, Atari ST, IBM PC, and 512K Macintosh**.

★ We are in the age of the *Star Trek* Renaissance. Trekkies can now rock to the song "Star Trekkin' Across the Universe;" tune into *Star Trek: The Next Generation*; and boot up *Star Trek: The Rebel Universe* from **Simon & Schuster Software**. Fans will be excited to know that the game is a graphic adventure, representing a break from the past two text adven-



Unlike its predecessors, *Star Trek: The Rebel Universe* is a graphic adventure.

tures, *Star Trek: The Kobayashi Alternative* and *Star Trek: The Promethean Prophecy*. The game has another new element: You will take on not only the role of Captain Kirk, but also that of Spock, McCoy, or

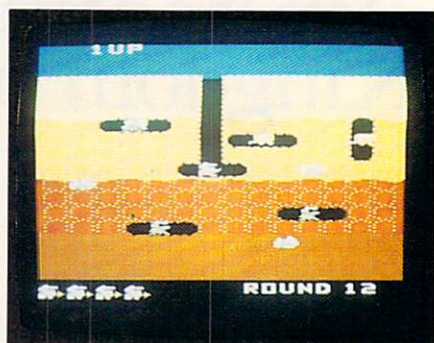
any other officer of the *USS Enterprise*. *Star Trek: The Rebel Universe* is for the **Atari ST** (\$40) and slated for the **C 64/128** and **IBM PC**. Simon & Schuster Software says to watch for the fourth *Star Trek* game, scheduled for release at the end of the year.

★ The definitive board game has been dressed up for the computer age. You can now buy up choice property, such as Park Place and Boardwalk, in *Monopoly*, the computerized game from **Virgin Games**. Virgin Games obtained exclusive rights from **Parker Brothers**, the originators of the board game that has sold 100 million copies worldwide. *Monopoly* (\$40) is ready for the **Apple, C 64/128, IBM PC, and Macintosh**.

★ Step behind the Iron Curtain and into a world of espionage, intrigue, and gripping suspense in *Border Zone* from **Infocom**. Consecutively play the roles of an American businessperson, an American spy, and a KGB agent, all of whom are entangled in an assassination plot. You'll need to draw upon your resources to stay alert and to keep a steady hand and a cool head. Search dogs, electric fences, and border guards keep you on edge. Every second counts because the game is played in real time. This is the latest creation from **Marc Blank**, a pioneer in interactive fiction, who brought us *Zork*. For \$35-\$40, **128K Apple, C 64/128, 128K IBM PC, and 512K Macintosh** owners can enter the *Border Zone* right now.

★ Joining the growing ranks of computer flight simulators is *Falcon* (\$50) from **Spectrum HoloByte**. In the cockpit of the *Falcon*, an F-16 fighter, you'll have all the controls, gauges, and displays within arm's reach. With your **IBM PC or 1MB Macintosh**, you'll perform yo-yos, loops, and scissors and engage in dogfights head-to-head. (For the IBM PC version, you'll need 384K if you want to access the special feature, a black box recorder.)

★ With a new generation of gamers coming of age, the classic arcade games turned computer games are sure hits. **Thunder Mountain**, the budget entertainment division of



Dig Dug is for **64K Apple, C 64/128, and 128K IBM PC** owners.

Mindscape, is bringing back *Pac-Man*, *Ms. Pac-Man*, *Dig Dug*, *Pole Position*, and *Galaxian* (\$10 each) for **64K Apple, C 64/128, and 128K IBM PC** owners.

—LISA WU

GAME HINTS

THE ETERNAL DAGGER (Strategic Simulations, Inc.). You are invited to participate in a quest that spans several continents and takes you up in the skies, over land and sea, and even deep underwater. *The Eternal Dagger* won **FAMILY & HOME-OFFICE COMPUTING's 1987 Critics' Choice Award** (see the *January issue*) for the best role-playing adventure. (Apple, Atari, C 64/128)

★ **Magic Items Chart:** Keep track of the scrolls, potions, wands, and staffs that the characters carry and/or tote in their backpacks. Hold onto the valuable items and sell the less valuable ones.



The Eternal Dagger garnered a **1987 Critics' Choice Award** for best role-playing game.

★ **Dexterity Chart:** Characters with high dexterity are good fighters because they can use their powers first as well as more frequently. Upon reaching 45 on the dexterity scale, a character can handle most opponents.



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CIRCLE READER SERVICE 17

ENTERTAINMENT

★ **Protection Chart:** List each character's bash, cut, thrust, flame, cold, storm, and life-drain defenses. Balance the effect of each character's wound by giving each the appropriate magic object. First give extra protection to your scout and then to your chief wizard and chief priest. If you are in possession of drain-proof armor, keep it; if you find it, buy it.

★ **Character Skills and Weapons Chart:** Track each character's skills; you should give each one a field of specialty. One character should be master of medicine. Three characters should have high karma and power points. Two characters should have good hunting and tracking skills. There should be one thief with search, trap, disarming, and lock-picking skills, and one scout with scanning abilities.

—JAMES DELSON
New York, New York

THE LURKING HORROR (Infocom). Set in a university, *The Lurking Horror* begins in the computer lab, where you're working diligently on a program. Bizarre things happen, and soon you find yourself in the dark underground tunnels that connect the "edifices of education." Rats and slimy objects abound, and you may not be blessed with a flashlight. Who knows what you'll encounter next. (Amiga, Apple, Atari, Atari ST, C 64/128, IBM PC, Macintosh)

★ To retrieve the keys from the hacker, take the Chinese food from the fridge. Put the food in the microwave and heat it on high for four minutes. Trade the food for the keys.

★ Becoming tired? Drink the Coke that's in the fridge.

★ To move the pallets of junk, drive the forklift to the old storage and move the junk five times.

★ To pass the waxer, wait until the waxer moves to the east, and then follow. Keep doing this until you come to the ax. Put the gloves on and then break the glass cabinet. Take the ax and chop the cord. Pour the wax on the floor.

★ To find the professor and escape from him, make sure you have a knife. Knock on the Alchemy Department door and wait. Show the note (you'll find it on top of the dome) to the professor. Walk south and wait

until he starts chanting. Cut the pentagram with the knife and leave it. Move the workbench, open the trap door, and go down.

★ To escape from the weather dome, dig into the earth. Take the hand and go down. Throw the stone at the creature. Walk down the steps and outside to retrieve the stone.

★ The urchin has something you want; claim it by sticking the hand in the elixir of life and showing it to him.

★ To eliminate the rats, walk east until you come to the steam valve. Open it (with the crowbar): The rats will die. Then close the valve.

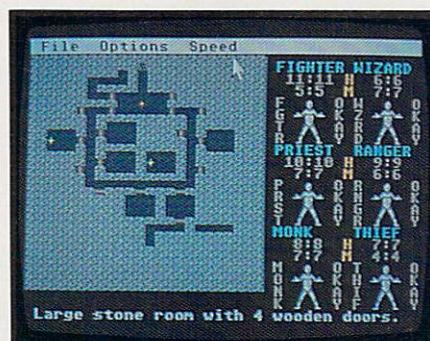
★ To take the ax and flask past the tomb of the unknown tool, put the boots on and open the elevator. Stick the crowbar in the doors. Go down. Dislodge the loose brick and take it. Wrap the chain around the crowbar, then use the padlock to keep it from slipping. Go up. Take the crowbar. Go up again and push one of the call buttons.

★ Having problems in the maze? Put the ring on the living hand.

—ERIC SHEW
Pullman, Washington

PHANTASIE III: THE WRATH OF NIKADEMUS

(Strategic Simulations, Inc.). The Dark Lord Nikademus intends to conquer the entire world. He must be stopped, and you are the chosen savior. You and your crew of six will face Nikademus in the Final Confrontation. In this war-strategy and tactics game, you can either generate new characters or engage



Phantasie III: The Wrath of Nikademus

established ones. (Amiga, 64K Apple, Atari ST, C 64/128, IBM PC)

★ Until your characters' fighting

strengths are high enough to eliminate the bad guys, use option nine for combat, and keep everyone in the back row. Use missile weapons to wipe out the attacking creatures before they capture you.

★ Each time you dole out your experience points during the first few play sessions, give the full three shares to your wizard, two to your priest, and one to each of your other characters. Since the early part of the game mostly comprises fighting, this will allow the wizard to master combat spells. Strong spells are more effective than strong fighters in keeping the rest of the characters alive, especially against attacks by massive enemy groups.

★ As soon as you have a strong wizard and a strong priest, drop one of your fighters and add a new wizard. Two wizards are better than one.

★ Conserve healing and magic potions. Although the supplies may seem inexhaustible (especially if you teleport from town to town to deplete armory stocks), they are not.

—JAMES DELSON
New York, New York

SHADOWGATE (Mindscape). This interactive graphic adventure sends you to Shadowgate, a decayed, mystical castle. Take a deep breath and move carefully. You are the last of an ancient line of kings, and you must stop the evil Warlock from destroying the land. (Amiga, Macintosh)

★ To obtain a key, open the skull over the arch.

★ In the hallway, open the book, and take the odd torch. You will need it later.

★ The silver arrow points the way to a secret passage.

★ The Wraith is allergic to green flame.

★ Put the sphere on the lake to freeze it. After you obtain the key, melt the ice with the torch.

★ Gather a pebble from in front of the waterfall. Also, look behind the waterfall for useful gems. Save them to use later.

★ In the mirror room, use the hammer on the middle mirror.

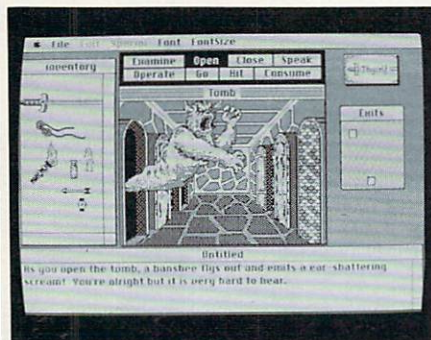
ENTERTAINMENT

★ Load your slingshot with a stone and fire at the cyclops. The well contains a surprise.

★ In the library, read *The Magic Arts, Volume One: First Steps* to learn magic. Use the scroll in the desk to open the globe in the study. If you have been cursed by the Wraith, the potion will cure you.

★ In the observatory, use the shooting star to operate the painting.

★ In the tower, the silver arrow, the holy water, and the shooting star



Shadowgate is for Amiga and Macintosh owners.

will kill the maiden, the hellhound, and the wyvern, respectively.

★ In the lava room, open the magic book, and then use it on the statue.

★ In the well room, make a wish with the appropriately engraved coin.

★ In the throne room, return your heritage to Sir Doogan.

★ Ring the gong to attract the ferryman's attention and give him one of the coins with a skull on it.

★ Use Ulterior Humana on yourself to pass the troll.

★ Use Instantum Illuminaris on the gargoyles to stun them.
—BARRY MORRIS, *Newbury Park, California*, and ADRIAN ROSTON, *New York, New York*

CONVERSIONS

The Bard's Tale (Electronic Arts). Now available for Atari ST and IBM PC. Already out for Amiga, 64K Apple, Apple IIGs, C 64/128. Reviewed in April 1986 issue and *Software Review* 1987.



The Bard's Tale is now ready for Atari ST and IBM PC owners.

Earl Weaver Baseball (Electronic Arts). Now available for 128K IBM PC. Already out for Amiga. Reviewed in October 1987 issue.

Marble Madness (Electronic Arts). Now available for Apple IIGs and Atari ST. Already out for Amiga, 128K Apple, C 64/128, IBM PC. Reviewed in February 1987 issue.

Might and Magic (New World Computing/Activision). Now available for C 64/128 and IBM PC. Already out for 128K Apple. Reviewed in July 1987 issue.

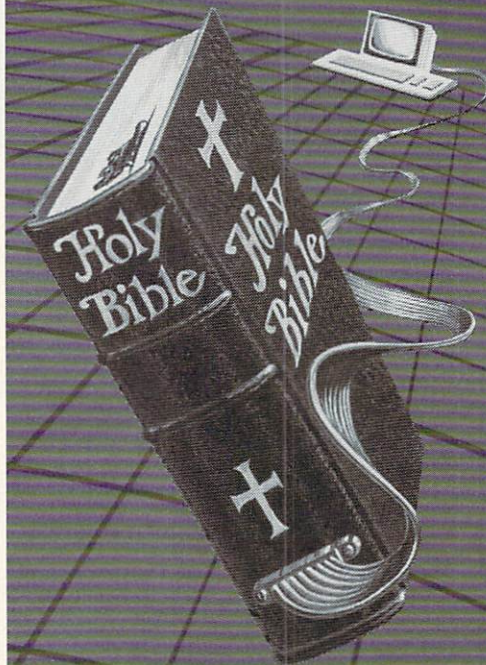
World Tour Golf (Electronic Arts). Now available for Apple IIGs. Already out for C 64/128 and IBM PC. Reviewed in March 1987 issue.

EDITOR'S NOTE: Titles listed for the IBM PC will also run on many IBM compatibles. Owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

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Don't miss the opportunity to share your original game hints and tips with other readers. Submit entries to: Entertainment Editor, FAMILY & HOME-OFFICE COMPUTING, 730 Broadway, New York, NY 10003. Include your name, address, telephone number, a short description of the game, and the brand and model of computer you own. If your tips are selected for publication, we'll award you a new game for your computer. We reserve the right to edit submissions for accuracy, clarity, and length. Unfortunately, we won't be able to acknowledge each submission. ■

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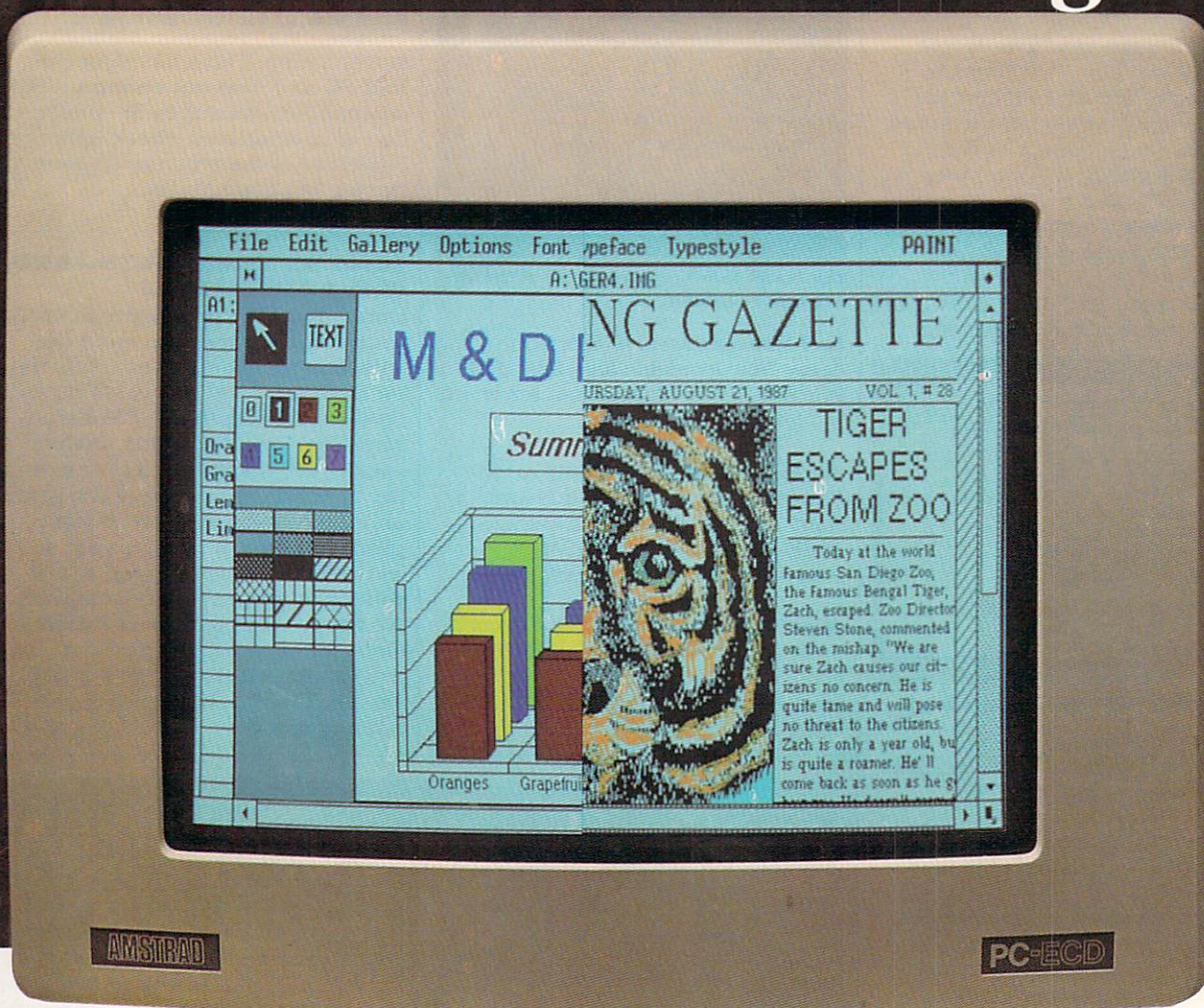
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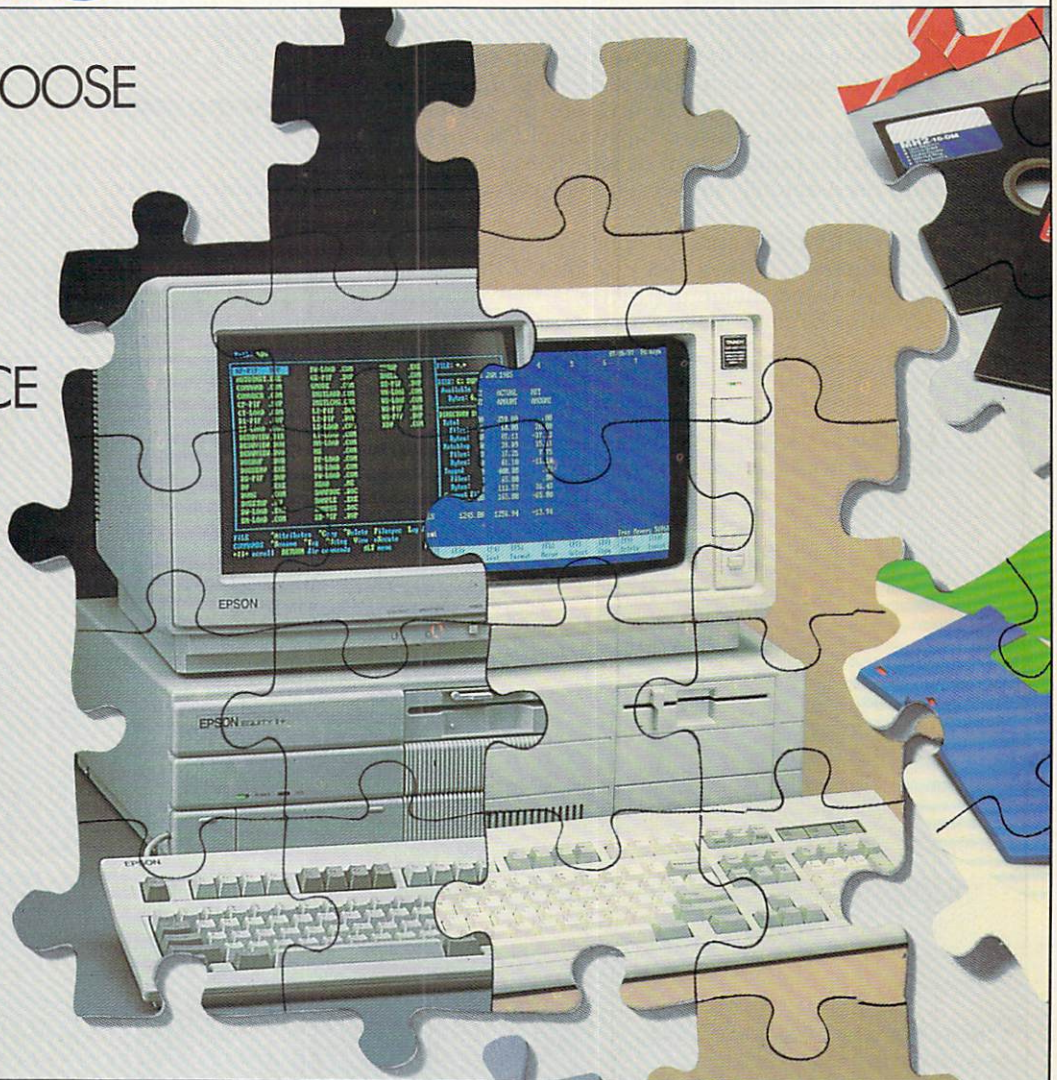
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Solving the IBM-Compatibles Puzzle

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COMPUTING™**

HOW TO CHOOSE
THE RIGHT
MACHINE
IN A FAST-
CHANGING
MARKETPLACE

BY
**STEVE
MORGENSTERN**



Shopping for an IBM-compatible computer was relatively simple for a while. There were two basic types from which to choose—PC XT compatibles and PC AT compatibles. Even these two weren't all that different, since much of the same software and hardware worked on both systems. In essence, the AT just did the job faster.

Then, in 1986, Compaq introduced the Compaq 386. This next-generation MS-DOS computer, using the powerful Intel 80386 microprocessor, redefined personal computer speed and caused mild tremors in an otherwise stable market. Nonetheless, the first 80386 com-

puters still ran the same software and peripheral devices as their more established XT and AT cousins. The purchase decision was essentially a choice among speed, more speed, and super speed.

What really shook up potential buyers was the tidal wave of alphabet soup unleashed by IBM in April 1987. Suddenly there were PS/2 and OS/2 and VGA and MCGA. Time to issue an SOS!

A year later, buyers are still confused. The terms *IBM compatible* and *MS-DOS computer* mean different things to different people. There are now two distinct IBM types (PC/XT/AT and PS/2), four microprocessors (8088, 8086, 80286, and 80386), two operating systems (MS-DOS and OS/2), two sizes of disk drives (3.5-inch and 5.25-inch), and several graphics "standards" (Hercu-

STEVE MORGENSTERN is a contributing editor for FAMILY & HOME-OFFICE COMPUTING.

les monochrome graphics, CGA, MCGA, EGA, and VGA). Within limits, you can mix and match these various features to customize your system.

To help clarify the picture, descriptions of the various MS-DOS computer classes, the IBM PS/2 line, and Microsoft's new operating system, OS/2, follow. The one-page "Shopping Tips" section attacks the buying problem from a different angle, looking at the importance of various features, such as type of monitor or disk drive. Finally, the chart lists major manufacturers and models of high-speed, high-capacity MS-DOS machines.

PC AND XT COMPUTERS

INTEL 8088 AND 8086 CHIPS

The most basic distinction among MS-DOS computers is the microprocessor chip that serves as the central processing unit (CPU)—the "brain" of the computer. There was a time when only techies talked about chips; but now, with the proliferation of MS-DOS models, the type of chip used actually presents an easy way to separate machines.

The original IBM PC and XT models used the Intel 8088 microprocessor. When IBM introduced these models, there were three major distinctions between a PC and an XT—the XT had more expansion slots, a hard-

disk drive, and a power supply large enough to support a hard-disk drive. In the compatibles world, though, this distinction has become meaningless. Most so-called "PC compatibles" today include power supplies hefty enough to handle a hard drive (130 watts or more), and many so-called "XT compatibles" are sold without the hard drive installed. The PC or XT label doesn't define the number of expansion slots either. At this stage, ignore the "PC" or "XT" on the label—just check the system features.

The 8088 chip runs at a single speed (4.77 megahertz or MHz). Several similar microprocessors run substantially faster, including the 8088-2 and the 8086 (both at 4.77MHz and 8MHz). Computers with these faster microprocessors are often labeled "turbo PCs," to distinguish them from the original and slower IBM PC.

AT COMPUTERS

INTEL 80286 CHIP

You see a real jump in performance when you move up to computers based on an Intel 80286 microprocessor. These include the IBM PC AT (no longer manufactured) and compatibles and the IBM PS/2 Models 50 and 60.

The 80286 is significantly faster (up to 16MHz) and can access more memory (up to 16 megabytes or MB) than the 8088 or 8086 chip.

The new IBM PS/2 family, from left to right:
Model 25, 30, 50, 60, and 80.



COMPAQ DESKPRO 386 Model 40 from
Compaq Computer Corp.



EPSON Equity III+ from Epson America, Inc.

KAYPRO 386 from Kaypro Corp.



In addition, an AT computer normally includes at least one high-density, floppy-disk drive. Compared to a standard 5.25-inch PC floppy disk that holds 360K, a high-density floppy holds 1.2MB (1,228K). An AT disk drive can read information from either high-density or standard floppy disks, but can write information reliably only in the high-density format.

AT computers offer two types of expansion slots. One type (called an 8-bit slot) can accommodate the same expansion cards used in standard PC and XT computers. The other (a 16-bit slot) uses expansion cards especially designed for the AT. The 16-bit slots transfer data more quickly and thus speed up system performance.

The number of each type of slot provided in each machine varies among models and manufacturers (see chart).

"386" COMPUTERS

INTEL 80386 CHIP

The Intel 80386 microprocessor represents the next major performance jump in the MS-DOS world. When running MS-DOS software (as opposed to OS/2 software, discussed later), the primary distinguishing characteristic of 80386 computers is their raw speed. All run at 16MHz, and some run at 20MHz—blindingly fast.

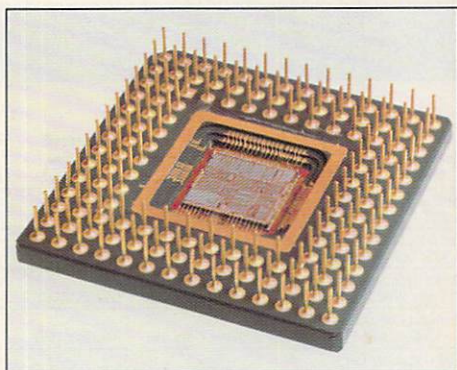
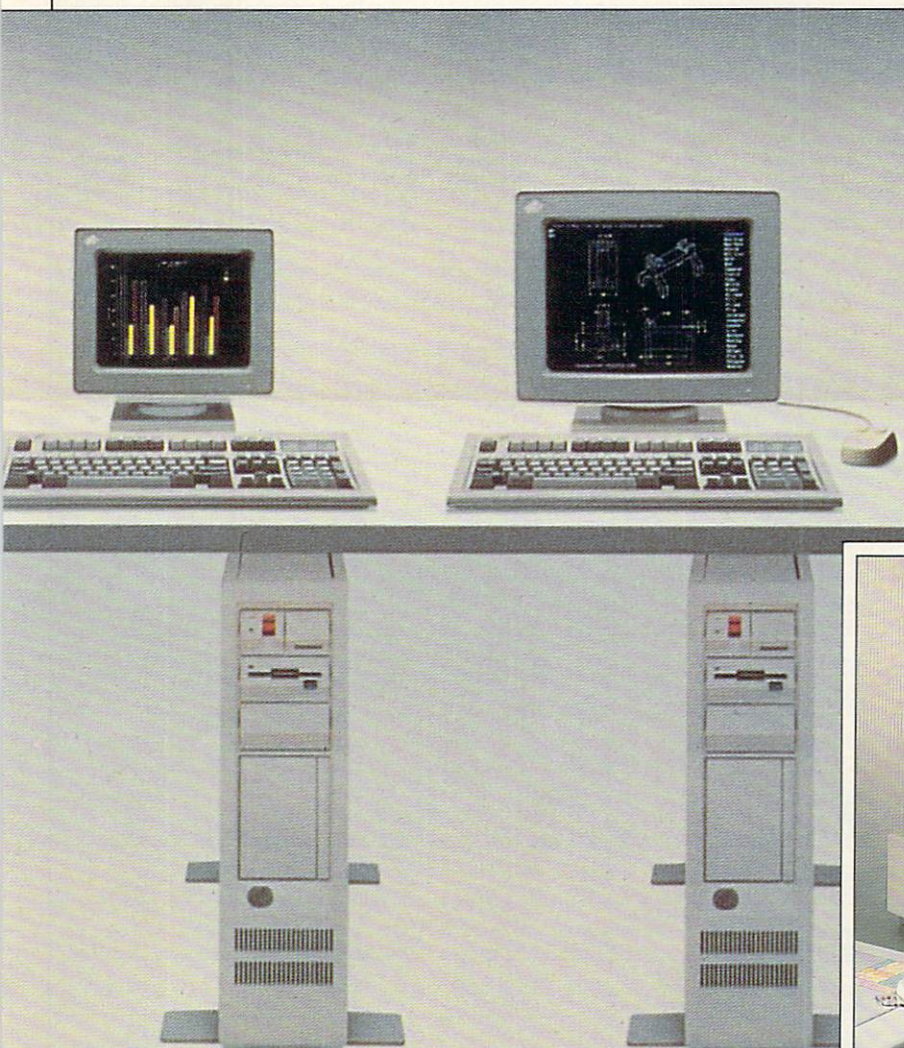
The first 80386 machines from Compaq and other manufacturers essentially adhered to existing AT standards, as far as operating systems and expansion board configurations go. However, besides AT and XT expansion slots, most 80386 computers also include one or more 32-bit slots (see chart).

As long as they run MS-DOS, as they all do, 80386 machines are essentially superfast ATs. Making major changes in the operating system and system architecture was left to IBM—a challenge Big Blue accepted and met with its PS/2 Model 80 computer and the OS/2 operating system.

IBM PS/2 COMPUTERS

As far as microprocessors go, the PS/2 line of computers has the same breakdowns as the aforementioned MS-DOS types. What makes them different? Unlike most MS-DOS computers, the PS/2 machines all run PC-DOS (IBM's customized version of MS-DOS), all use 3.5-inch disk drives, all use different graphic display routines, and some have different system architectures.

Both the PS/2 Model 25 and the Model 30 are built around the Intel 8086 microprocessor, the same one used in some of today's PC and XT compatibles. However, their 3.5-inch disks store 720K, compared to the



The Intel 80386 microprocessor was introduced by Intel in 1986.



NEC APC IV PowerMate 2 from NEC Information Systems, Inc.

GUIDE TO HIGH-SPEED, HIGH-CAPACITY MS-DOS COMPATIBLES

Choosing between one computer system and another is not an easy task; especially since list prices for some models include features that are optional on others.

Often, these optional features are as important to the computer system as a steering wheel is to a car. Be aware that the lure of a low price may be deceiving. Here are some things to consider when shopping for a machine.

What is a Standard Configuration?

For the purposes of this chart, we have defined "standard configuration" to mean a system with a minimum of 512K, a keyboard, single floppy-disk drive, 40MB hard-disk drive, Hercules compatible monochrome/graphics display card, monochrome display monitor, parallel port, serial port, and DOS.

When the manufacturer's list price of any unit did not include these basic system requirements, we added the cost of the missing components to the system price. For example, a hard-disk drive controller card is considered optional on some systems when in fact it's required for hard-disk drives. In this case, the system price in the chart includes the price of the controller card. In certain cases, the missing component simply wasn't available (for example, some systems are only available with 20MB or 32MB hard drives). Our chart also lists extra components, such as a second serial port, that many manufacturers include in their "standard configurations."

80286 MACHINES

Company Model	System Price ¹	Standard/ System Memory ²	Floppy-Disk Drives ³ (included)	Hard-Disk Drive Capacity/ Access Speed (included)	Ports (included)	Expansion Slots ⁴	Micro-processor Speed (MHz)	Wait State (Cycles)	Software Included *		Warranty (Months)
									DOS Ver.	Other	
AST Research, Inc. AST Premium Workstation Model 245	\$3,490	1MB/4MB	1	40MB/28 ms	P, 2 S, eEGA	2 AT	6/10	1	3.2	GW, DC	12
Advanced Logic Research, Inc. ALR Dart System Model 40	\$3,284	1MB/2MB	1	40MB/28 ms	P, S, M/G	6 AT, 2 PC	10	1	3.3	GW	12 limited
Arche Technologies, Inc. Arche Rival 286	\$2,195	640KB/640KB	1	20MB/65 ms	P, 2 S, G, M/G	6 AT, 2 PC	8/12	1	3.3	GW	24 limited
Compaq Computer Corp. COMPAQ DESKPRO 286 Model 40	\$5,548	640KB/2.1MB	1	40MB/30 ms	P, S, M/G	5 AT, 2PC	8/12	1	3.2	GW, DIA, DC	12 limited
Dell Computer Corp. PC's Limited 286-8	\$2,099	640KB/640KB	1	40MB/40 ms	P, 2 S, M/G	4 AT, 2 PC	6/8	1	3.21	GW	12, on-site
PC's Limited 286-12	\$2,799	640KB/640KB	1	40MB/28 ms	P, 2 S, M/G	4 AT, 2PC	6/12	1	3.21	GW	12, on-site
Epson America, Inc. Epson Equity II+	\$3,093	640KB/640KB	1	40MB/28 ms	P, S, M/G	3 AT, 3 PC	8/10	1	3.2	GW, DIA	12 limited
Epson Equity III+	\$3,593	640KB/640KB	1	40MB/28 ms	P, S, M/G	7 AT, 2 PC	6/8/12	1	3.2	GW, DIA	12 limited
47th Street Computer Maxum 286 Turbo 6-8	\$1,969	640KB/1MB	1	43MB/23 ms	P, S, G, M/G	6 AT, 2 PC	6/8	0	3.3	GW	12
Maxum 286 Turbo 6-10	\$2,020	640KB/1MB	1	43MB/23 ms	P, S, G, M/G	6 AT, 2 PC	6/10	1	3.3	GW	12
Maxum 286 Turbo 8-12	\$2,120	640KB/1MB	1	43MB/23 ms	P, S, G, M/G	6 AT, 2 PC	8/12	1	3.3	GW	12
Hyundai Electronics America SUPER-286c	\$1,999	640KB/1MB	1	30MB/65 ms	P, 2 S, eEGA	4 AT, 2 PC	8/10	1	3.2	GW, DIA	18
IBM Corp. IBM PS/2 Model 50-021	\$3,965	1MB/1MB	1 ⁵	20MB/80 ms	P, S, M, VGA	3 MC-16B	10	1	3.3	GW, DIA	12
IBM PS/2 Model 60-041	\$5,665	1MB/1MB	1 ⁵	44MB/40 ms	P, S, M, VGA	7 MC-16B	10	1	3.3	GW, DIA	12
Kaypro Corp. KAYPRO 286	\$2,995	1MB/1MB	1	40MB/38 ms	P, S, eEGA	2 AT, 3 PC	6/12	1	3.21	GW ⁷	12
Leading Edge Hardware Products, Inc. Leading Edge Model D2	\$2,495	640KB/1MB	1	65 MB/28 ms	P, S, eEGA	4 AT, 2 PC	6/8/10	1	3.2	GW ⁶	20
NEC Information Systems, Inc. NEC APC IV PowerMate 1 ⁸	\$4,445	640KB/640KB	1	40MB/40 ms	P, S, EGA	5 AT, PC	8	1	3.2	GW, DIA	12 limited
NEC APC IV PowerMate 2 ⁸	\$4,945	640KB/640KB	1	40MB/40 ms	P, 2 S, EGA	6 AT, 2 PC	8/10	1	3.2	GW, DIA	12 limited
PC Designs, Inc. PC Designs GV-286 Model 801	\$2,202	1MB/1MB	1	40MB/28 ms	P, 2 S, M/G	6 AT, 2 PC	8	1	3.3	GW	12
PC Designs GV-286 Model 100	\$2,427	1MB/1MB	1	40MB/28 ms	P, 2 S, M/G	6 AT, 2 PC	10	0	3.3	GW	12
PC Designs GV-286 Model 120	\$2,952	1MB/1MB	1	40MB/28 ms	P, 2 S, M/G	6 AT, 2 PC	12	0	3.3	GW, Desquieu 2.0	12
Tandon Corp. Tandon Targa 40	\$3,079	1MB/1MB	1	40MB/45 ms	P, S, M/G	2 AT, PC	6/8	1	3.2	GW, MS Windows	12
Tandon Targa 40 Plus	\$3,479	1MB/1MB	1	40MB/45 ms	P, S, M/G	2 AT, PC	8/10	1	3.2	GW, MS Windows	12
Tandy Corp. Tandy 3000HL	\$3,649	512KB/640KB	1 ⁹	40MB/28 ms	P, M/G	3 AT, 4 PC	4/8	1	3.2	GW	12
Tandy 3000	\$4,149	640KB/640KB	1	40MB/28 ms	P, S, M/G	7 AT, 2 PC	6/12	1	3.2	GW	12
Wells American A*STAR Model 300	\$2,600	1MB/1MB	1	32MB/32 ms	P, 2 S, G, M/G	6 AT, 2 PC	6/8/10/12/14	1	3.3	GW	12 limited
A*STAR Model 400	\$2,800	1MB/1MB	1	44MB/28 ms	P, 2 S, G, M/G	6 AT, 2 PC	6/8/10/12/14	1	3.3	GW	12 limited
Wyse Technology WYSEpc 286 Model 2108-20	\$2,633	512KB/512KB	1	20MB/68 ms	P, S, M/G	5 AT, 2 PC	8	1	3.2	GW	12 limited
WYSEpc 286 Model 2112-40	\$4,033	1MB/1MB	1	40MB/28 ms	P, S, M/G	5 AT, 2 PC	8/12.5	1	3.2	GW	12 limited
WYSEpc 286 Model 2214-40	\$4,533	1MB/1MB	1	40MB/28 ms	P, S, M/G	6 AT, 3 PC	8/12.5	0	3.2	GW	12 limited
Zenith Data Systems Z-248	\$4,649	512KB/512KB	1	40MB/40 ms	P, S, EGA	4 AT, 2 PC	8	0	3.21	MS Windows	12
Z-286	\$3,149	512KB/512KB	1	20MB/80 ms	P, S, eEGA	3 AT, PC	8	1	3.21	MS Windows	12

80386 MACHINES

Company Model	System Price ¹	Standard/ System Memory ²	Floppy-Disk Drives ³ (included)	Hard-Disk Drive Capacity/ Access Speed (included)	Ports (included)	Expansion Slots ⁴	Micro-processor Speed (MHz)	Wait State (Cycles)	Software Included *		Warranty (Months)
									DOS Ver.	Other	
AST Research, Inc. AST Premium/386 Model 340	\$5,890	1MB/1MB	1	40MB/28 ms	P, 2 S, eEGA	32P, 4 AT, 2 PC	20	0-1	3.3	GW, DC	12
Advanced Logic Research, Inc. ALR 386/2 Model 40	\$4,579	2MB/2MB	1	40MB/28 ms	P, S, M/G	2 32P, 4 AT, 2 PC	16	2	3.3	GW, DC	12
Compaq Computer Corp. COMPAQ DESKPRO 386 Model 40	\$7,073	1MB/10MB	1	40MB/28 ms	P, S, M/G	32-INTEL, 2 AT, 3 PC	16	0-1	3.3	GW, DC	12 limited
Dell Computer Corp. PC's Limited 386-16	\$4,399	1MB/1MB	1	40MB/28 ms	P, 2 S, M/G	32P, 5 AT, 2 PC	16	0	3.21	GW	12, on-site
IBM Corp. IBM PS/2 Model 80-041	\$7,365	1MB/1MB	1 ⁵	44MB/40 ms	P, S, M, VGA	3 MC-32B, 4 MC-16B	16	0	3.3	GW, DIA	12
Kaypro Corp. KAYPRO 386 Model A	\$5,318	512KB/1MB	1	40MB/28 ms	P, S, M/G	2 32P, 3 AT, 2 PC	8/16	1	3.21	GW, SpeedStor	12 limited
NEC Information Systems, Inc. NEC PowerMate 386 ⁸	\$6,845	1MB/1MB	1	40MB/40 ms	P, 2 S, EGA	32-INTEL, 5 AT, 2 PC	16	1	3.2	GW, DIA	12 limited
PC Designs, Inc. PC Designs GV-386	\$3,428	1MB/4MB	1	40MB/28 ms	P, 2 S, M/G	6 AT, 2 PC	16	0	3.3	GW, Desquivew 2.0	12 limited
Tandy Corp. Tandy 4000	\$4,749	1MB/2MB	1 ⁵	40MB/28 ms	P, S, M/G ¹⁰	32P, 6 AT, 2 PC	16	0-1	3.2	GW, DeskMate II	3
Wyse Technology WYSEpc 386 Model 3216-40	\$5,533	1MB/1MB	1	40MB/28 ms	P, S, M/G	6 AT, 3 PC	8/16	0	3.2	GW, DC	12
Zenith Data Systems Z-386 Model 40	\$6,649	1MB/1MB	1	40MB/40 ms	P, S, eEGA	3 32P, AT, 2 PC	16	0	3.21	MS Windows/386	12

KEY: 32-INTEL = 32-bit INTEL-compatible slot; 32P = 32-bit proprietary slot; AT = 8/16-bit expansion slot; DC = disk caching; DIA = Diagnostics; eEGA = enhanced EGA (also supports monochrome graphics); EGA = Enhanced Graphics Adapter (supports CGA and EGA); G = game port; GW = GW-BASIC; M/G = Monochrome/Graphics (Hercules-graphics compatible); M = pointing device port for the new IBM Personal System/2 Mouse; MC-16 = 16-bit Micro Channel slot; MC-32 = 32-bit Micro Channel slot; MS = Microsoft; ms = millisecond; P = parallel port; PC = 8-bit expansion slot; S = serial port; VGA = Video Graphics Array; * Check with manufacturer.

¹System price for standard configurations plus additional equipment added in order to create a system; ²Memory that comes with basic system and/or maximum amount of memory that can be added to the motherboard without using an expansion board; ³1.2MB 5.25-inch floppy-disk drive, except where noted; ⁴Not all expansion slots are available for future expansion; ⁵1.44MB 3.5-inch floppy-disk drive; ⁶Also includes 1.5 Leading Edge Word Processing; ⁷Also includes WordStar Professional 4.0, Word Finder, and SpeedStor; ⁸EGA system with NEC Multisync monitor; ⁹360K 5.25-inch floppy-disk drive; ¹⁰Also supports color graphics.

MANUFACTURERS' INFORMATION

AST Research, Inc.
2121 Alton Ave.
Irvine, CA 92714
(714) 863-1333
(714) 863-1480

Advanced Logic Research, Inc.
10 Chrysler
Irvine, CA 92718
(714) 581-6770

Arche Technologies, Inc.
745 High St.
Westwood, MA 02090
(617) 461-1111
(800) 422-4674

Compaq Computer Corp.
20555 FM 149
Houston, TX 77070
(713) 370-0670

Dell Computer Corp.
9505 Arboretum Blvd.
Austin, TX 78759
(512) 338-4400

Epson America, Inc.
2780 Lomita Blvd.
Torrance, CA 90505
(213) 539-9140

47th Street Computer
36 E. 19th St.
New York, NY 10003
(800) 221-7774
(212) 260-4410

Hyundai Electronics America
4401 Great America Parkway
Santa Clara, CA 95054
(408) 986-9800
(408) 980-7561

IBM Corp.
Old Orchard Road
Armonk, NY 10504
(800) 447-4700

Kaypro Corp.
533 Stevens Ave.
Solana Beach, CA 92075
(800) 4-KAYPRO
(619) 481-4300

Leading Edge Hardware
Products, Inc.
225 Turnpike St.
Canton, Mass 02021
(800) USA-LEAD
(617) 828-8150

NEC Information Systems, Inc.
1414 Mass Ave.
Boxboro, MA 01719
(617) 264-8000

PC Designs, Inc.
2500 N.Hemlock Circle
Broken Arrow, OK 74012
(800) 322-4872
(918) 251-5550

Tandon Corp.
405 Science Dr.
Moorpark, CA 93021
(805) 378-6104
(805) 523-0340

Tandy Corp.
1800 One Tandy Center
Fort Worth, TX 76102
(817) 390-3700

Wells American
3243 Sunset Blvd.
West Columbia, SC 29169
(803) 769-7800

Wyse Technology
3571 N. First St.
San Jose, CA 95134
(800) GET-WYSE
(408) 433-1000

Zenith Data Systems
1000 Milwaukee Ave.
Glenview, IL 60025
(800) 842-9000
(312) 699-4800

SHOPPING TIPS: HOW TO EVALUATE A SYSTEM'S FEATURES

Do you need a high-speed 80286 or 80386 machine, or is a standard XT compatible all you require? Do you have to follow IBM into the "brave new world" of OS/2, PS/2, MCA, and VGA in order to keep up with the times? Which monitor and disk drive will suit you best? Let's briefly examine these small pieces of the larger puzzle.

Speed. The MS-DOS universe has followed the Macintosh lead and turned its attention to graphics-based displays, with multiple windows and mouse-oriented point-and-click selection procedures. To make graphics-intensive software work successfully, you need speed—more speed than the XT machines can comfortably provide. Now, there's even some major application software that virtually requires an 80286 machine, notably Microsoft's *Excel* spreadsheet and Aldus's *Page-Maker* desktop-publishing program. These programs are both graphically oriented, clearly the wave of the future in MS-DOS applications.

In addition to running graphics-oriented software, you can use the increased speed of 80286 computers to expedite number crunching in large spreadsheets and sorting through large databases. However, you can do adequate work with an ordinary PC, particularly if it is outfitted with a math co-processor chip to speed up calculations. And if your primary interests are word processing, education, entertainment, or telecommunications, the speed provided by an XT compatible will be more than adequate.

If sheer speed is the object, why not an 80386 machine? Money! The 80286 machines are much better deals; but if you really need speed and can afford it, an 80386 machine is certainly faster. For some extremely graphic-intensive professional applications, such as computer-aided design, the extra expense of an 80386 computer might be justified. The main appeal of the 80386 today, though, is for multiuser corporate installations.

The speed of a computer is generally listed as clock speed (measured in megahertz or MHz), referring to the computer's internal timer that synchronizes operations. The faster the clock speed, the faster the performance within a computer class. (And there is a direct relationship between clock speed and price—the faster the clock speed, the more expensive the computer.) That is, an AT running at 12MHz will get the job done significantly faster than an AT running at 6MHz.

However, clock-speed figures are not valid comparisons among classes of microprocessors. That is, an 80286 machine running with a 16MHz clock speed is nowhere near as fast as an 80386 machine running at 16MHz.

In fact, even models with the same CPU running at the same clock speed will exhibit some performance differences based on other hardware considerations, such as memory management techniques or "wait state." Wait state (see chart) affects the overall speed of your system much like a bottleneck affects the flow of traffic on a highway. If there is one or more wait states, the system has to slow down. A state of zero means there's no bottleneck.

Monitor Choices. The new graphical orientation in application and system software requires higher screen resolution and often some kind of color graphics capability. But if you don't feel you need a color display, you can get high resolution for a relatively low cost with a Hercules-compatible monochrome system. The text resolution is quite sharp, and many programs (such as Lotus 1-2-3) will display monochrome graphics. When in doubt, go with a monochrome graphics system, which is how the machines in the chart are configured.

If you want a color monitor, the best choice is an Enhanced Graphics Adapter (EGA) system. A standard CGA (Color Graphics Adapter) color monitor connected to a CGA interface will be good for graphics, but the text display won't be sharp enough for extended use.

An EGA monitor and EGA interface, though desirable, are considerably more expensive. Together, the package will run around \$700, at discount. And while many computers have built-in CGA interfaces, more often than not the EGA interface is an option. The Leading Edge Model D2, Kaypro 286, and Zenith Z-248, however, have EGA video output built-in.

Another option is to buy an enhanced EGA (eEGA) system. This adapter gives you monochrome graphics as well as enhanced color graphics, so you can start with a monochrome monitor and later upgrade to an EGA monitor.

Whatever graphics interface you choose, when selecting a monitor, consider a "multisync" monitor, such as the NEC MultiSync. These versatile monitors are substantially more expensive than standard EGA displays, but offer considerable future expandability. A multisync monitor can work with a monochrome graphics adapter and all other adapters, up to and including a VGA adapter. The most you'll have to do to make the switch is buy a new cable or an inexpensive adapter.

As far as VGA itself, the graphics interface built into the IBM PS/2 Models 50, 60, and 80, there's little software that now requires a VGA monitor to run. If and when that changes, you'll be able to add a VGA board to a non-IBM system.

Disk-Drive Choices. Consider the sturdier

3.5-inch disk, but keep in mind that there's still plenty of software available only in 5.25-inch format. Adding a 3.5-inch drive later is always an option.

If you are buying an 80286 or 80386 machine, you obviously need power, and so you need a hard-disk drive. Much new application software absolutely requires a hard-disk drive, and many programs that technically will work with floppies are much easier to run from a hard-disk drive. All computers in our chart are configured with a hard-disk drive.

The access speed of the hard-disk drive is important, too. Forty milliseconds (40 ms) is the acceptable access speed for an 80286 machine. Any hard drive with an access speed higher than 40 ms requires the computer to wait when loading or saving information. The lower the access speed, the more expensive the hard drive.

MS-DOS Versus OS/2. One of the main reasons to buy an 80286 or 80386 machine is to have the option of running OS/2. But even among corporate users with large budgets, there's great uncertainty about the importance of converting to OS/2, at least right now. Many are taking a wait-and-see attitude. After all, there is no unique application software on the market today that requires OS/2. The standard advice that "you buy the computer hardware that will let you run the application software you need to run" is still valid in this changing marketplace, and until new software arrives, there is nothing an OS/2 user can do that an MS-DOS user can't, except multitasking.

Moreover, nobody predicts the demise of MS-DOS anytime soon. There are about 16 million IBM XT and AT compatibles around the world. That is an enormous market, and there is no chance that those machines will suddenly become "orphans" just because IBM has shifted gears.

Still, people like to know that they can upgrade to OS/2 at a later date. If you ever decide you need to run OS/2, remember that many PC and XT computers can be upgraded to 80286 machines with add-on boards.

Support Services. You'll want to make sure that you'll receive the necessary support services after you make a purchase. Whether you buy from a retail outlet or a mail-order company, you're entitled to after-sale technical assistance. Ideally, a mail-order company will have a toll-free technical-support phone line, and a retailer will gladly help you solve minor problems even after you've signed the check. However, vendors are less willing to help you if you buy your system's components from more than one dealer. Unless you have a good reason to do otherwise, buy all components from one vendor.

360K of the PC and XT disks.

The PS/2 Model 50 and 60 both use the Intel 80286 microprocessor, while the Model 80 uses the 80386; their drives store 1.44MB. As noted in the accompanying chart, the Model 50 and Model 60 differ primarily in terms of system expandability. Beyond this, the Models 50, 60, and 80 have several key features in common, which make them different from other MS-DOS machines.

VGA Graphics. IBM built a new color graphics adapter into its high-end PS/2 computers. VGA can display 16 colors simultaneously in high resolution (640-by-480 pixels) and 256 colors in medium resolution (320-by-200 pixels). Before VGA, the commonly adopted standard was EGA, which can display 16 colors at a not-quite-as-sharp 640-by-350 resolution.

To support VGA's increased color graphics capability, IBM also switched from digital to analog monitors, which generally display more colorful images.

You don't need a PS/2 computer to display VGA graphics. IBM itself sells a \$595 add-on board that brings VGA graphics to standard 80286 or 80386 computers. In addition, add-on graphics board makers (such as Paradise, Quadram, and Video-7) have already cloned the VGA board. On high-end PS/2 computers (the 50, 60, and 80), however, no board is necessary because the VGA adapter is built-in.

Micro Channel Architecture. The expansion slots in the PS/2 Models 50, 60, and 80 machines don't accept standard XT or AT expansion boards, breaking the long string of backward compatibility that has helped the MS-DOS market grow so rapidly. Instead, these PS/2 computers adhere to a new standard called Micro Channel Architecture (MCA).

What will MCA boards do that conventional expansion boards will not? They promise to transfer information considerably faster. The related side effects and advantages that brings remain to be seen.

Another unresolved question is the ability of other manufacturers to clone the Micro Channel Architecture, which they will have to do to produce true PS/2 compatibles. Several are working on it, and IBM is reportedly talking to some manufacturers who want to license the technology (see the "Machine Specifics" IBM section in this issue). But the future—and relative importance—of Micro Channel Architecture is unclear.

OS/2 OPERATING SYSTEM

It has become common practice to refer to "IBM compatible" computers when, in fact, people are really talking about MS-DOS compatible systems. Microsoft, creator of MS-DOS, supplies the operating system to individual equipment manufacturers, who often "tweak" it to work with their hardware's distinctive features. IBM calls its own version PC-DOS; Compaq calls its version Compaq DOS. Applications software, however, runs the same under PC-DOS or MS-DOS.

Microsoft's Operating System/2 (OS/2) will work the same way, with each equipment manufacturer adding desired fillets. Because OS/2 was developed jointly by Microsoft and IBM, and some consumers mistakenly think it runs only on IBM's PS/2 line, you'll probably see ads in which manufacturers *boast* that their machines can run OS/2. The fact is that *all* 80286 and 80386 machines are capable of running OS/2.

What's the point of OS/2, and why bother changing when MS-DOS has served so many so well for so long? After all, the standard OS/2 costs \$325, and upcoming extended editions will cost twice that—while MS-DOS

comes bundled with most computers. The reason for OS/2 is that the 80286 and 80386 microprocessors have powerful capabilities that are not fully exploited by MS-DOS.

OS/2 Benefits. First, the 80286 chip can address up to 16MB of memory (that's 16,384K), but MS-DOS can only address 640K. Second, the 80286 and 80386 chips support "protected" modes, which enable users to run several programs at once. Each program behaves as if it were running on its own separate computer, thanks to the ingenious system management techniques built into the chip. The ability to run several programs simultaneously is called *multitasking*.

MS-DOS does not have the capability to fully tap either the extended memory or multitasking capabilities of these advanced chips. Patchwork solutions have been developed, of course, and some work quite well. Most of the major software developers banded together to support an expanded memory specification (EMS) that allows MS-DOS programs to address up to 8MB of memory. Overlay programs, such as Microsoft *Windows* and *Desqview*, enable users to implement a limited form of multitasking using MS-DOS application programs. None of these approaches, though, completely unleash the performance potential of the 80286 or 80386 chips.

Working together, Microsoft and IBM developed a new operating system to accomplish just that. OS/2 will address up to 16MB of memory directly, paving the way for enormous application programs. It also fully supports the protected mode of the 80286 and 80386 chips, which makes it a complete multitasking environment.

OS/2 System Requirements. It takes more than just the right microprocessor (80286 or 80386) to run OS/2. A minimum of 2MB of RAM is required for the basic OS/2 operating system (3MB of RAM are minimum for the extended edition), along with a hard-disk drive. OS/2 will not run on PC or XT computers.

Well before the first version of OS/2 was released last December, with the essential memory management and multitasking functions, new editions were already planned. A graphics user interface called *Presentation Manager* will be included in Standard Edition 1.1, promised by IBM for November of this year. The *Presentation Manager* provides a Macintosh-like environment, very similar to the current Microsoft *Windows Version 2.0* or *Windows/386* that is controlled with a mouse.

Finally, making use of OS/2 features will require new application programs. In other words, in addition to buying an expensive new operating system, you'll also have to buy expensive new software and possibly new hardware to bring your system up to speed.

CONFUSION, BUT GOOD DEALS

For all of the confusion in the marketplace, it's still a good time to buy an MS-DOS computer. The reason is financial, plain and simple. With the establishment of a new "high ground" of 80386 computing, came a dramatic drop in the price of both the powerful 80286 machines and the more modest PC and XT systems. You can get a good XT system for around \$1,000 and a good 80286 system for around \$2,000. These systems include hard-disk drives and monitors (see chart).

The price of graphics display adapters has also dropped considerably, though monitor prices have remained fairly steady. Hard drives, which were once priced strictly for big business purchasers, now cost as low as \$300 (for 20MB drives).

The corporate dream machine of 18 months ago is the home-office computer of today. That's progress. ■

Who's Working at Home—and Why?

PRODUCTIVITY AND QUALITY OF LIFE ARE MAIN MOTIVATORS — ESPECIALLY FOR BABY BOOMERS WITH CHILDREN **BY NICK SULLIVAN**

You know colleagues who work at home. You hear of friends who have started businesses in their basements. You read about it in *Time*, *Fortune*, and *Business Week*. You call a company looking for a business contact and are told the person you're calling is working at home for the day.

Who are these people? What are they doing, and why? Do they like it? To answer these and other questions, we called Tom Miller, director of the 1987 National Work-At-Home Survey. The second annual survey conducted by Link Resources, a New York-based research firm, examined in-depth 850 homemaker and 850 non-homemaker households. The main finding of the nationally projected survey: More than 23 million Americans perform some or all of their job-related work at home.

"Two things stand out in this year's data," says Miller. "More people are relying upon the computer to help them be productive at home, and more people are spending longer hours at home."

Miller is one of those 23 million American homeworkers. He can often be found at home in Geneva, New York, about 350 miles from his employer's New York City office. Surrounded by a computer, a facsimile phone, and a telephone, Miller analyzes data and then disperses it—to clients who fund the survey, corporate newsletter editors, and newspaper reporters. All are hungry for details on this fast-growing social trend.

When he's not home, Miller is on the road, conducting focus groups with homeworkers or corporations interested in telecommuting programs. He probably sees as many hotels as a circus performer sees tent cities. Once we tracked him down to a Boston hotel and asked for room 42. "You want Miller?" asked the hotel clerk. "He's on the phone." Miller gets to know people in hotels and airports because they help him carry his bulging cases stuffed with computer printouts. "I keep my pockets full of singles so I can tip porters," he says. "And when I get

home, I go to a chiropractor."

Much of the Work-At-Home data on product and phone usage is proprietary, since clients have paid top dollar for inside information. Nonetheless, Miller outlined key findings, some of which may describe you.

Q: Disregarding the numbers for a second, can you paint a picture of these homeworkers?

A: The more I look at the data, the clearer the picture that emerges. The whole growth trend may be a function of baby boomers. The essential profile is one of married couples—in certain job positions, with children at certain ages—who blend family and job responsibilities by working

child care, and then they don't spend any time together as a family. So, many say, 'I want to get out of the rat race. I can make less money but gain control of my time, my life.' The Reagan era has marked a return to conservative, family values.

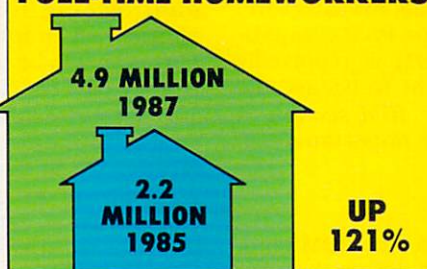
Q: More than half of your respondents have children 18 years old and younger, and almost 70 percent of the kids are home some time during the day—yet people don't cite children as a reason for working at home. Why not?

A: That's a narrow reading of the data. First of all, many work at home only eight hours or less a week, and their primary reason is to catch up on work. Or maybe it's for corporate advancement. The second and third reasons cited are "convenience," and "no choice," both of which may mean caring for children. Self-employed homeworkers and those who are home 35 to 40 hours a week more commonly cite family and personal flexibility.

Q: About 25 percent of homeworkers own computers. Does that figure seem high or low to you?

A: It seems low to me. Last year, when we sampled higher income households, the rate was 31 percent. Still, looking at incomes higher than \$30,000 in this year's data, the rate is 30 percent. And 25 percent is well above the national penetration rate, which is about 17 percent.

SELF-DESCRIBED FULL-TIME HOMEWORKERS



at home part of the time. Productivity and quality of life are the main motivators.

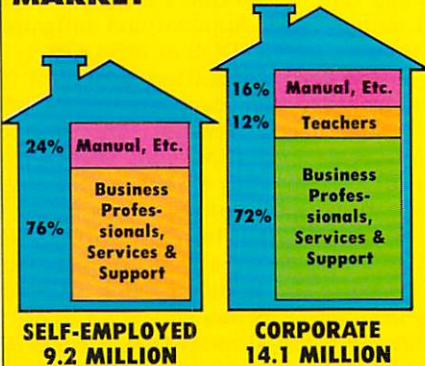
There are many more corporate homeworkers than self-employed homeworkers, and the corporate types are younger and better educated. This reflects not only the baby boom demographics, but a steady change in corporate culture.

Q: Why are people being squeezed so much? It certainly doesn't fit the affluent yuppie/M.B.A. prototype.

A: I think the declining dollar has a lot to do with it. Take an income of \$40,000—it doesn't buy what it did 10 or 20 years ago. People don't have much choice except to make more money—by working longer or starting a small business—or to make their lives richer.

Say both parents work. They have to make a lot of money to pay for full-time

U.S. HOME-OFFICE MARKET



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Also, if you look at the breakouts, the figures are more telling. More than 64 percent of engineers and scientists own computers; 39 percent of self-employed business professionals, such as consultants, accountants, researchers; 38 percent of salespeople; 33 percent of self-employed home-business owners; 30 percent of finance and insurance professionals.

Q: What industry spawns the most computerized homeworkers?

A: Media, at nearly 40 percent, and the government, at 35 percent.

Q: What type of worker is most likely to work at home?

A: The biggest group is comprised of business professionals, at 25 percent. That group encompasses lawyers, teachers, engineers, scientists, and media and M.B.A. types. Managers account for 14 percent of corporate homeworkers.

Q: Is there any significant difference from last year as far as computer ownership?

A: Last year, self-employed businesspeople indicated a high intent to purchase computers, and that was borne out by this year's figures. They saw the benefits, became comfortable, and really started taking to the machines.

Q: Do many people take tax write-offs on computer and office equipment?

A: Yes, 47 percent amortize their office expenditures. And 65 percent of self-employed amortize, because it's easier for them to do so under the Internal Revenue Service rulings.

Q: What's the number one task?

A: The most common work-at-home activities are writing and talking on the phone—more than five hours a week for each.

Q: What kind of homemaker doesn't have or need a computer?

A: There are islands of people who have no need for or have a resistance to technology. Certain segments of the blue collar work force—self-employed bakers, plumbers, carpenters—are not computer literate. They work at home after-hours, keeping their books straight, but without computers. Then, there's an older segment that grew up on typewriters; they resist computers. Over age 45, computer ownership drops dramatically.

Finally, doctors and dentists may own computers but are more likely to use them to play games, not do work.

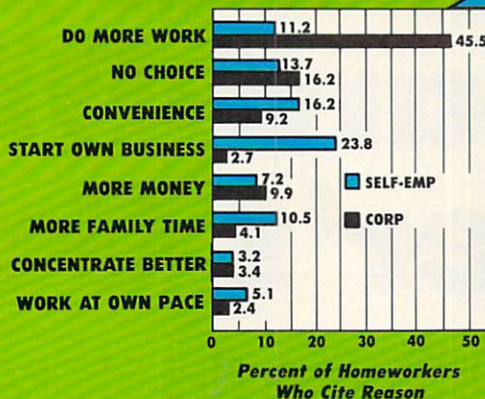
Q: More than 900,000 homeworkers use modems, but another 350,000, who once used modems, have stopped. Why?

A: Roughly one-third said the cost was too high; one of six said modems were too hard or complicated to use; and one of 10 said not enough co-workers were reachable via electronic mail.

Q: How many homeworkers own facsimile phones or machines?

A: About 200,000. And another 100,000

WHY PEOPLE DECIDE TO WORK AT HOME



to 125,000 say they plan to buy a fax phone this year.

Q: What can you deduce about the future from the data on modems and fax machines?

A: The potential for modems has not been fulfilled yet. Electronic mail has not yet supplanted talking on the telephone—except to specialized users—because it apparently hasn't been perceived as an enhancement or improvement. It's possible that a fax machine, which is easier to use, quicker, and requires no keyboarding skills, may be a productivity tool that is more widely accepted than electronic mail.

Q: What are the major advantages for homeworkers?

A: Reading right from the survey, the top five overall advantages are: Increased Productivity, 40 percent; Fewer Distractions, 38 percent; Being Your Own Boss, 32 percent; More Time for Self, 28 percent; and More Time for Children, 28 percent. Of course, the advantages vary greatly depending on the homeworker segment.

Q: Where does 'less commuting time' rank?

A: Less commuting ranks sixth, at 25 percent.

Q: What are the major disadvantages?

A: First of all, 20 percent of the universe says they are unhappy with working at home, which is up from last year's figure. That fits in with the theory that people are being squeezed and often work at home just to keep up.

The top four disadvantages are: Work Too Much, 33 percent; Less Time for Self, 28 percent; Hard to Separate Personal and Work Life, 26 percent; and Less Time for Children, 15 percent.

The disadvantages are basically the opposite of the advantages. But note that they are less strongly expressed, indicating that the advantages outweigh the disadvantages.

Q: Having scrutinized this data for two years, what major trends do you see?

A: First, the number of people who describe their work at home as full-time has

risen 60 percent each of the last two years. Second, the number of corporate homeworkers is growing much faster than the self-employed sector. While the overall homeworker universe is growing 7.5 percent a year, the corporate sector is closer to 9 percent, and the self-employed sector closer to 6 percent.

Q: How are these corporate workers getting away with it? It's a little like playing hooky, isn't it?

A: There was a time when people tried to hide it, especially during the 9–5 hours, but working at home has more credibility now. It's considered positive, a good trend to be part of.

Q: What's the corporate attitude toward telecommuting?

A: It's a mixed bag. Many managers are convinced that people get more work done at home. But an astounding number of managers are reluctant to endorse telecommuting because they think everyone will want to do it, because they like to see people working in front of them, and because it creates administrative hassles. This last point is valid, but there's a price for everything. What managers overlook is the cost of working in an office, and that includes high absenteeism.

Q: You work at home. What do you like or dislike about it?

A: Number one, I spend more time with my family. Number two is productivity. I get more done in my cocoon than at the office. I miss not having a secretary right here with me, but I certainly don't miss any equipment. I've got a computer and a fax machine.

One thing I do miss by working at home is watching a project evolve from day to day. Working at home, I don't always keep up with the changes, and I don't share them with others. Hearing about something after the fact over the phone just isn't the same.

Q: Have you taken the Work-At-Home survey to see how you compare with the norm?

A: No, I haven't. Never even thought of it. Maybe I should. ■

The MS-DOS Hard-Disk User's Guide

HOW TO DESIGN A FILE-STORAGE SYSTEM THAT SUITS YOUR WORK STYLE

BY STEPHEN MILLER

Hard-disk drives are becoming more and more necessary on computer systems that are used with any regularity. Many current programs will work effectively only on hard drives. Even some games come in packages with multiple floppy disks, with the recommendation that they be run from hard drives. Fortunately, the cost of a hard drive has dropped to an affordable level (see February's "Buyer's Guide to Hard-Disk Drives").

The major reason, however, for using a hard drive is to make your computing life easier: No more disk swapping; no more DISK-FULL messages that always seem to occur at the worst possible moment; no more files lost somewhere in a pile of unlabeled floppies. In short, a hard drive can solve the numerous problems that plague computers with dual-floppy systems. As with any solution, though, a hard drive brings its own set of concerns.

Having 10, 20, 30, 40, or more megabytes of storage can seem wonderful after the 360K limit on most MS-DOS floppy drives (400K or 800K on Macintosh floppies). But that much space can create other problems. My 20MB hard disk contains 3,782 files. How do I find the notes on an article I wrote a year ago when I can't remember what I named the file? Scrolling

Contributing editor STEPHEN MILLER writes the Tandy column in the Machine Specifics department. His last feature article was "Connect!: A Dress Rehearsal for Logging on to Information Systems," which appeared in the December issue.

through all those files and typing out the contents of likely candidates would make me grayer than I am now. Fortunately, MS-DOS is designed in such a way that you can bring some organization to your hard drive using subdirectories. (Macintosh uses a similar "folder" system.)

SUBDIRECTORIES

The MS-DOS subdirectory system is set up in a tree structure. It begins with a base or root directory. From the root directory, all the subdirectories branch out (hence, the tree analogy). In turn, each subdirectory can have branches, and each of those branches can have its own branches, and so on. Another way of looking at subdirectories is through the parent/

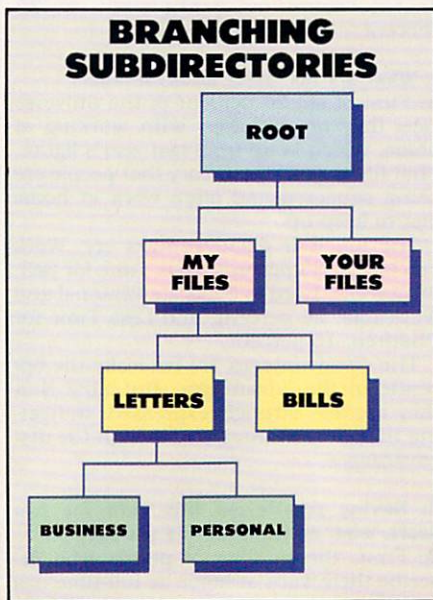
child metaphor. Any subdirectory can be a parent, and subdirectories under it are its children.

Creating Subdirectories. To create a subdirectory, you use the command MKDIR or MD (MAKE DIRECTORY), entering a backslash (\) and the name of your new subdirectory—MD\MYFILES, for instance. The subdirectory is formed below the root directory and is ready to store files. Starting from the root (as the parent), we create MYFILES and YOURFILES as its children (see diagram). MYFILES becomes a parent with two children—LETTERS and BILLS. In turn, LETTERS, as a parent, has BUSINESS and PERSONAL as children. You can extend this analogy as far as you want, adding subdirectories under BUSINESS for specific clients, for instance.

Removing Subdirectories. If you don't like the subdirectories you've established or no longer need them, you can remove them as easily as they were created. The command RMDIR or RD (REMOVE DIRECTORY) is used to delete subdirectories. There are three important things to remember about deleting subdirectories: 1) The command must be given while you're in the parent directory; 2) The subdirectory must be empty of files; and 3) All of its subdirectories must be empty of files and deleted first.

This safety catch prevents you from inadvertently wiping out a number of files. For instance, I couldn't delete the LETTERS subdirectory if the BUSINESS or PERSONAL subdirectories were still active.

Pathnames. Moving around subdirectories is accomplished with the



command CHDIR or CD (CHANGE DIRECTORY), followed by the path that leads you to the right branch of the tree. For instance, to change to the personal letters subdirectory, you would follow its path: C:\MYFILES\LETTERS\PERSONAL. The statement following CD is called a pathname.

DESIGNING A SYSTEM

Creating subdirectories is one thing; creating them in a pattern that boosts efficiency is something else. How you organize your hard drive can have either a positive or negative effect on your work. Who's going to be using the computer? How many different programs are going to be used? What kind of work will be done by the various users? The answer to those questions can help determine how your hard drive should be organized. Use the diagrams and systems described here to map your own flowchart on paper before converting it to your hard drive.

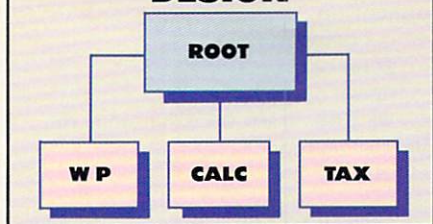
There are three main systems for organizing a disk—application-based, task-based, or user-based. The application-based system is the most common. It operates on the assumption that each program should occupy a separate subdirectory. In fact, many programs automatically set up their own subdirectories when copied onto a hard drive. The application-based system further assumes that only one person will be using the computer.

Application-based System. Here's how an application-based drive could be organized for an accountant (see diagram). Our accountant uses three programs—a word processor, a spreadsheet, and a tax-preparation package. Under the root directory, there would be a WP subdirectory, a CALC subdirectory, and a TAX subdirectory. All the accountant's correspondence is in the WP subdirectory, all spreadsheets are in the CALC subdirectory, and all tax returns are in the TAX subdirectory.

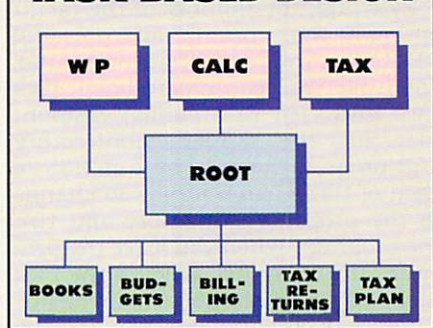
Task-based System. The task-based system operates on the theory that work is founded on client services and not on the software. Let's set up the directory structure, based on our accountant's services, using the same three application programs. The accountant does straight bookkeeping for some clients. He also does budgeting and planning. He provides both tax preparation and tax planning. And finally, he keeps his own records. Thus, we create subdirectories under the roots called BOOKS, BUDGETS, RETURNS, TAXPLANS, and BILLING (see diagram).

The three programs—word proces-

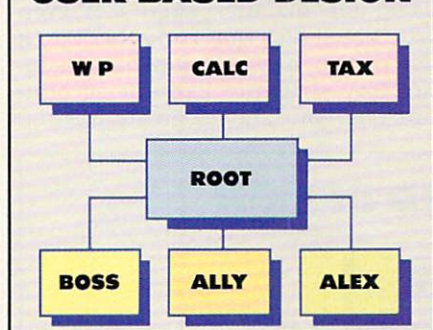
APPLICATION-BASED DESIGN



TASK-BASED DESIGN



USER-BASED DESIGN



sor, spreadsheet, and tax-return preparer—are held in their own subdirectories, as before. Our accountant uses whichever program fits the task at hand, then saves the file in the appropriate subdirectory by using a complete pathname. If the accountant is using the word processor and wants to save a file in the BUDGETS subdirectory, the statement SAVE \BUDGETS\FILENAME is used.

Even though different programs may be used to create the budget files, all the files are stored under the BUDGETS subdirectory and easily found. The other subdirectories operate in the same manner.

User-based System. We assume here that our accountant's business has grown to the point where two assistants are needed. The assistants, Ally and Alex, are each assigned to various accounts. The structure for this system is as follows—BOSS, ALLY, ALEX (see diagram). Again, the three main programs are stored in their own subdirectories. As with the task-based system, all the applications are

used by each person; but each person saves files only in the subdirectory.

However, if Ally creates a file that she wants Alex to read, she can save it in her subdirectory (\ALLY\FILENAME) and in Alex's (\ALEX\FILENAME). Alternatively, she can COPY the file from her directory to Alex's, just as she would copy a file from one disk to another.

Multifaceted System. Obviously, these organization systems can be mixed and matched to create a system to accommodate any kind of business or family need. Here's how a combination system could be set up for our accountant's business. We will start with an application-based system, then divide that into a user-based system, followed by a task-based system (see diagram on next page). Under the root directory, we still have subdirectories called WP, CALC, and TAX. Under each application we will add the BOSS, ALLY, and ALEX subdirectories. Under each person's subdirectory will go the BOOKS, BUDGETS, RETURNS, TAXPLANS, and BILLING subdirectories. If you wanted, you could take it to another level by adding subdirectories for each client.

TREE COMMAND

At this point, the hard-drive system is starting to resemble a Pentagon Table of Organization gone wild. If, in the midst of creating a subdirectory system, you lose track of which subdirectory branches where, use the TREE command in DOS. It will list all the directories, their subdirectories, and all files in each. Use the command TREE /F > PRN to print this information.

The more complex the system, the longer it will take to access the deeper subdirectories. If, for example, you wanted to work on the taxes for one of Ally's clients, Johnson Drugs, you would have to type CD\TAX\ALLY\TAXPLAN\JOHNSON just to get to the right place to begin work. Fortunately, there are ways to accomplish that with just a keystroke or two. You can set up a simple menu system using batch files, which will allow you to quickly navigate through a complex file system.

BATCH FILES

Batch files, which all have file names ending in the extension BAT (FILENAME.BAT, for example), enable you to give multiple commands to DOS without typing them one at a time. You can create a menu system using batch files that will automatically change to the correct subdirectory and load an application.

The first thing to do is either create

or alter your AUTOEXEC.BAT file. This is a file that DOS automatically looks for when you turn on your computer. Here's how to create an AUTOEXEC.BAT file that displays a list of menu options when you boot up the computer. While in the root directory (CD), at the C prompt, type:

```
C> COPY CON AUTOEXEC.BAT
ECHO OFF
CLS
TYPE MENU.DOC
-Z (Press the F6 key or hold down the CTRL
key and type the letter "Z.")
```

RETURN (The system will respond with "1 file(s) copied.")

Next, we'll create the MENU.DOC file. This is just a text file with your menu options, which the computer will display when you boot up. Use the space bar to center the text on the screen. Press RETURN to double-space the text.

```
C> COPY CON MENU.DOC
      THE BEST ACCOUNTANT'S MENU
      1. WORD PROCESSING
      2. SPREADSHEET
      3. TAX RETURNS
-Z
RETURN
```

That's the menu you'll see when you boot up. Now, we create a batch file for each application (1.BAT, 2.BAT,

3.BAT) so that choosing a number from the menu will take you to the application.

```
C> COPY CON 1.BAT
ECHO OFF
CD\WP
WP (Here, insert the command to run
your word processor.)
CD\
CLS
TYPE MENU.DOC
-Z
RETURN
```

By typing the number of the menu option at the C prompt and pressing RETURN, you run that particular batch file. You can create batch files 2.BAT and 3.BAT in a similar fashion, inserting the proper subdirectory and program name. The function of each of these batch files is to change to the proper subdirectory and run the program. When you leave the program, the computer looks to the root directory and displays the menu.

You can create any number of batch files to automate repetitive functions (back up files and format disks, for instance). You can even write batch files that run other batch files. If you have a complicated subdirectory structure like our accountant has, you should create a BATCH

subdirectory (BATCH) and keep all those batch files in one place. You can then put the batch subdirectory in your path statement (see below), allowing you to zip around the most complex system with ease.

THE PATH COMMAND

The PATH command is a powerful DOS function that can make using a hard drive easier. As stated above, each subdirectory has a pathname, for example, \CALC\ALLY\BOOKS\JOHNSON. With a task-based or user-based system, problems can develop if you use more than one software package. Look at the most complex system (see diagram), and you'll see that the applications reside in separate directories. How do you get any of them running in different subdirectories? Do you load a copy of the word processor, the spreadsheet, and the tax program into each subdirectory? The copy-protection schemes on some programs won't allow that. Furthermore, you'd just waste valuable disk space copying a large application program into three subdirectories. That's where the PATH command comes in.

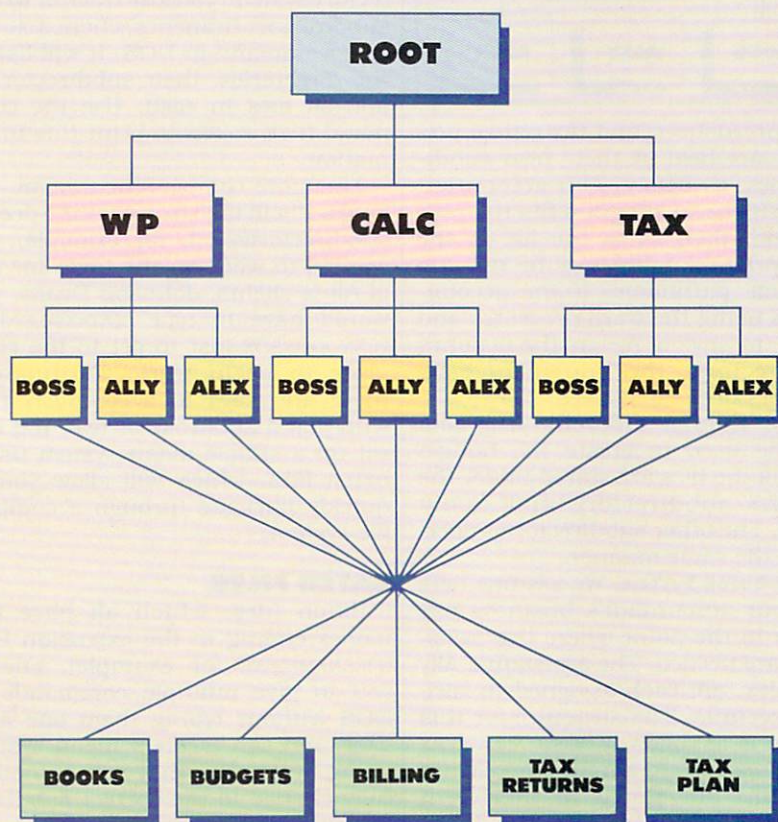
If the program or batch file you need to run is not in the current directory, you can instruct DOS to look in other directories for it, locate it, and run it. You can specify multiple subdirectories in this search. By inserting a PATH statement in the AUTOEXEC.BAT file, you can tell the computer to look in any of the following directories for program or batch files:

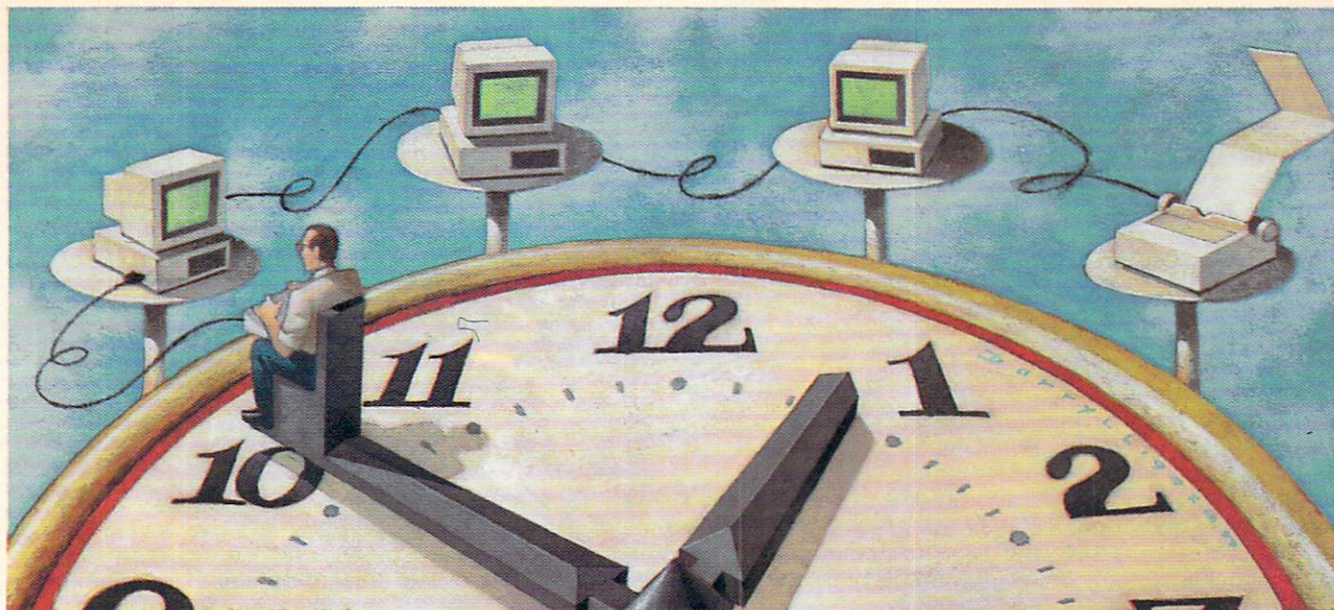
PATH = C:\WP\CALC\TAX\BATCH
Once the PATH is set, it stays active unless you change it or turn off the computer. If you have a long PATH statement—that is, one with many subdirectories—keeping it in the AUTOEXEC.BAT file saves you from typing it every time you want to run a program or batch file from a different directory.

LEARN BY DOING

Even if all of this talk about subdirectories and batch files seems abstract and beyond your ken, try doing it anyway. Hard-disk drives are much easier to work with than to read about. Make (MD) and remove (RD) a few subdirectories, just to catch the hang of it. Use the TREE command. Copy the batch file above, just to see how it works. Then customize it for your own purposes. Use the PATH command. And, if you want more explicit help, consult *Running MS-DOS* (Microsoft Press, Redmond, Washington; \$21.95), a clear guide to this often confusing operating system. ■

MULTIFACETED DESIGN





NOTE: This is Part One of a two-part article filled with word-processing tips and tricks to help you save time and reduce errors.

Word processing, the most popular of all computer applications, is usually the first experience people have with a computer. This association tends to continue, to one degree or another, as long as a person uses computers.

Word processing has one very strong element that makes it easier to grasp than some other computer applications: For the most part, the text that is typed using the keyboard appears character for character on the screen and later on printouts. From teaching software application classes for more than six years, I have found that the majority of people doing word processing tend to learn the features that have strong visual elements about them and ignore the features that require more abstract approaches.

The key to better computing is simple. Whenever possible, let the computer do it! In word processing, the goal is to find as many ways as possible of moving away from visually based, manual editing and toward automatic processing. Of course, you are limited by the features and power of your specific word processor, but almost everyone can take advantage of some of the shortcuts in this article. Also, this discussion may help

Timesaving Techniques for Word Processing

DIVIDE YOUR WORK TO CONQUER: PART ONE **BY ROB KRUMM**

you choose a new word processor that allows you to perform the techniques most useful for you.

DIVISION OF LABOR

One primary advantage of word processing over other forms of producing a document, such as typing, is that it allows you to create a "division of labor" among tasks. In his novel *Les Misérables*, Victor Hugo recalls the transition from medieval to modern production in the early 19th century. In the old production system, each worker was responsible for an entire job from beginning to end. First, the pottery worker shaped the clay into the proper form, then painted the decorations, glazed the clay, and baked it in the kiln. But Hugo's hero noticed that some workers were better at glazing pots than shaping them. So instead of having each worker do all the parts, he selected individual workers to specialize in only one part of the process. The result was an overall improvement in total production. This division of la-

bor into specialized areas is the basis of modern production.

When you produce a document on a typewriter you must perform several tasks simultaneously. You need to compose the text, edit for content, correct spelling, and decide on page layout and paragraph format all at once. When you use a word processor, it is no longer necessary to do everything at the same time. You can divide your labor into several separate jobs and concentrate on each one in its turn. Too many people place themselves at a disadvantage by trying to write, edit, format, and correct—with no separation. Common experience dictates that people perform better when they can concentrate on one task at a time.

The best way to use a word processor is to focus first on entering text—what you want to say. Then go back and perform corrections, manually or with tools such as style or spelling checkers. Finally, go through the document and concentrate on paragraph and page formatting. Format-

ting refers to specifications for margins, tabs, indents, boldface, underlines, centering, and pitch.

In the long run, you will find that you will do a better job on each of these tasks when you divide the labor than when you attempt to juggle all the jobs simultaneously.

TAGGING YOUR TEXT

While it makes sense to separate the actual formatting from text entry, the best time to make decisions about formats is while you are entering the text. Suppose you are using two different types of headings in a research paper or business proposal—major heads and subheads—and three different types of paragraphs: normal text, quotations, and notes. You hope the formatting will help a reader quickly see which paragraphs are notes and which are quotations. For example, quotations might have indented margins and be printed in italics. Notes might be indented more than the quotations and be printed in a smaller pitch, the 12 characters per inch (cpi) elite rather than 10 cpi pica. In addition, you want the major headings centered and the subheads underlined. The natural tendency is to actually format the headings and paragraphs as you write. But this method has a few pitfalls:

- It is easy to forget the exact settings you are using for the paragraph indents. For example, suppose you wanted to indent the note paragraphs 10 columns on the left and 7 columns on the right. You might erroneously set some notes at a right indent of 5 or 10. This mistake is easy to make when you are entering text because it may have been 15 or 20 minutes since you last entered a note.

- Entering text suffers because you've had to interrupt your train of thought to perform formatting commands. Since you might not remember the format for each type of paragraph, you would have to skip back through the text to find a paragraph previously formatted, check its settings, then return to your previous position in the text, and enter the appropriate commands. It sounds almost as confusing as it really is. Yet many of us work that way because it seems natural.

But a better approach to the same task is to tag, or mark, the paragraphs to indicate what style they should be, without taking the time to enter the formatting at the exact moment. Some word processors, such as the MS-DOS version of Microsoft Word, have a formal built-in tagging

STYLE TAGS ENTERED INTO THE TEXT OF THE DOCUMENT

→ @MAJOR@ THE WORLD'S SMALLEST NATION

→ @SUB@ ABOUT ANDORRA

In a world of powers and super-powers that fight to be the largest and most powerful nations, somebody has to be at the bottom of the ladder. That nation is the tiny republic of Andorra.

→ @QUOTE@ The nation of Andorra is officially called the Valleys of Andorra. The nation is located in the heart of the Pyrenees Mountains between the better-known nations of France and Spain. Andorra marks the beginning of the Iberian peninsula.

→ @MAJOR@ VITAL STATISTICS

→ @SUB@ POPULATION

→ @NOTE@ The 35,000 people of Andorra live on 188 square miles of land. That is a population density of about 180.85 people per square mile. The United States has an average population of about 65 people per square mile, the Soviet Union 30 people per

A:\ANDORRA.WP

Doc 1 Pg 1 Ln 5 Pos 10

Figure 1: Marking sections of text with tags—simple codes such as @SUB@ for subheads—lets you separate the act of writing from the task of formatting.

feature. With this feature you can use ALT—letter key combinations to mark paragraphs as headings, notes, quotations, or other specialized text. For example, ALT-N could mark a paragraph as a note. Word's big advantage is that it will automatically add the formatting, such as indents, to the paragraph as it is tagged.

However, the concept of tagging can be applied, in one form or another, in almost any word processor—whether it has a tagging feature or not. You can create your own tags by adding special symbols to the beginning or the end of paragraphs. For example, the &, @, and + characters don't often appear in documents. You might begin each major heading with @ and each subheading with @@. You could also mark your quotations with &Q& or your notes with &N&. (See Figure 1.)

There are several benefits to tagging.

- Typing the tags does not distract you from entering your text. You don't have to use any Control or Function keys, look at any menus, or otherwise interrupt the flow of your work (although you do have to remember your tag characters, with the advantage that you make them up yourself).

- Because tags are simple text items, it is much easier to change a tag than to reformat a paragraph. For example, suppose you can't decide whether a paragraph heading is a major one or a subheading. If you were actually formatting the paragraph, you would have to undo each formatting command if you changed your mind. In a tagging system, you only have to retype the tag.

- With most word processors, scrolling, printing, saving, and retrieving occur faster in documents if they are not formatted.

When you have completed the tagged document, you can then use

the search command to locate all the paragraphs with the same tag. For instance, suppose you wanted to format the quotation paragraphs. Use the search command to locate &Q&. Then enter your format commands. Continue the search for the particular tag and repeat the format commands. You can then remove the tag by either deleting it or by searching for it and replacing it with nothing. By concentrating on the formatting commands, you are more likely to be consistent in your formats because you are doing them one right after the other (see Figure 2).

Using this procedure results in a document that is consistently formatted in less time than it takes to stop and format each paragraph as you go. Separating tasks with this approach might seem counter-intuitive at first, but in the long run it is much more efficient than trying to do three or four jobs at the same time.

Tagging is an example of how the facilities of word-processing technology cause you to change the strategy of how to approach a task.

VARIATIONS ON THE THEME

You can extend the logic of paragraph tagging by creating two types of documents. Use the original document as the tagged document. Instead of formatting the tagged document, and in so doing removing the tags, simply make one or more copies of the file. Use the copies to try out different formatting styles. If you don't like the look of a format, you can use another copy of the original document and redo the formatting.

Another variation on the idea of formatting by tags is the use of keystroke macros to automate the process of entering formatting codes. The term "macro," a source of some confusion, refers to large commands that are assembled by linking a set of existing single commands or other

STYLE TAGS REPLACED BY FORMAT COMMANDS

THE WORLD'S SMALLEST NATION

ABOUT ANDORRA

In a world of powers and super-powers that fight to be the largest and most powerful nations, somebody has to be at the bottom of the ladder. That nation is the tiny republic of Andorra.

The nation of Andorra is officially called the Valleys of Andorra. The nation is located in the heart of the Pyrenees Mountains between the better-known nations of France and Spain. Andorra marks the beginning of the Iberian peninsula.

VITAL STATISTICS

POPULATION

The 35,000 people of Andorra live on 188 square miles of land. That is a population density of about 180.85 people per square mile. The United States has an average population of

A:\ANDORRA.WP

Doc 1 Pg 1 Ln 5 Pos 10

Figure 2: Once your writing is complete, search for a specific tag—such as @MAJOR@ for headings—and replace it with the appropriate formatting commands.

keystrokes. In a keystroke macro, the keys you normally press to execute a command or insert text are recorded, and the entire sequence is assigned to a single keystroke combination, such as ALT-Q. When you subsequently perform that keystroke combination, the full sequence is generated, saving time and avoiding errors.

Some programs—such as *WordPerfect*, *Microsoft Word 4.0*, and *AppleWriter*—have built-in macro facilities. Macros are also available on some systems by using such add-on programs as *Superkey* (MS-DOS) or *QuickKeys* (Macintosh), which allow you to record macros for any program. Macros work well in consort with tagging paragraphs. For each document tag, you could define a macro that formatted each paragraph. You would then use the search command to position the cursor on each tagged paragraph and execute the appropriate macro for that tag's associated style. You could even include the search command within the macro itself, so that a single keystroke combination would locate and format a paragraph with a specific style tag.

In general terms, here's an example of a similar macro that would link, in order, the following commands to format a quotation paragraph.

- Search for the next &Q& (the tag at the beginning of the paragraph), and replace it with nothing (get rid of the tag).
- Stop searching.
- Select the paragraph (this step would most often be needed for word processors that demand that you highlight text before formatting it, such as ones for the Macintosh; it might not be required for others).
- Set quotation margins (your choice).
- Set quotation tab stops (again, your choice).

- Start italic printing.
- Go to the end of the paragraph (with some word processors, you would search for the return character at the end of the paragraph).
- Stop italic printing.

BLOCKS AND FORMAT FILES

Most word processors allow you to define blocks of text for deleting, moving, or copying. These are powerful capabilities that people generally take advantage of to speed editing. But there are two other very powerful block-oriented operations that seem to be overlooked. They are:

1. Creating a file from a block. This type of function copies a selected portion of your existing document into a separate file. The advantage here is that the block of text—with its specific information and wording—can now be inserted anywhere into any document, not just used in your current one.

2. Inserting a file as a block of text. With this function you pull text stored in small files, such as ones created in step 1, into your current document. Depending on your word processor, this would be either a copy-and-paste operation or a command that loads a file into your current document at your cursor.

These two capabilities—two sides of the same coin—allow you to create a library of small files. These files, sometimes called "boilerplate," contain specialized parts of documents that can be called into your current document. Complex closings to form letters are an example. Each section of text can be stored on disk as a block and recalled at the end of a new letter. Carefully crafted sales letters with modular paragraphs tailored for different audiences are certainly another application.

The idea of maintaining a library of various text blocks on disk is a common notion when compared to an-

other valuable way to use block files. Word processors that store formatting codes directly in the text (such as *WordPerfect*, *WordStar 2000*, *MultiMate*, or *AppleWorks*) allow you to create block files that contain only the codes for a specific situation such as footnotes—margins, tabs, and font changes—but no text. Let's call them *format files*.

For instance, suppose that the majority of your documents contain the same types of formats for quotations, headings, or special notes. You can create a format file by storing only the formatted part of the paragraph without the actual text, one for each type of format. *WordPerfect* formatting, for instance, is controlled by special codes embedded in the text. The format file contains just these codes and no words, allowing it to be combined with any document.

When you want to format a paragraph with special margins or tab settings, you use the command to insert a file into the text. The file will bring in the tab and margin settings, automatically formatting the text. With most Macintosh word processors, you can copy the formatting ruler into the Scrapbook and paste it into documents as needed. Or with the *AppleWorks* word processor, you could store files of only format codes.

Inserting format files into your text is a possible alternative to using macros to repeat formats quickly without having to re-enter the commands. Format files can be even faster to work with than macros, depending upon how complex the formatting is for that paragraph.

Keep in mind that some word processing programs, such as the original *WordStar*, do not normally store formatting codes in the text, making the concept of format files irrelevant. *WordStar* has a little-known feature, however, called a text ruler line that can act as a format file. A text ruler line is a series of characters entered into the text that can be used to set margins and tabs. These ruler lines can be stored in format files and recalled into a *WordStar* document.

MORE TO COME . . .

As you've seen—and hopefully tried—with tags and blocks, formatting text can practically become child's play. That way, you can save your attention for the hard part of entering text or the even harder job of writing well. Next month, we'll explore further methods of automating document preparation, including the use of "mail merge" in formatting text. Join us. ■

THE SPREADSHEET WARS

BORLAND'S QUATTRO AND MICROSOFT'S EXCEL CHALLENGE LOTUS 1-2-3

BY STEVE MORGENSTERN

No software program dominates its application category the way Lotus 1-2-3 does. Researchers estimate that 1-2-3 holds 70–80 percent of the spreadsheet market, while none of its competitors can claim over 10 percent.

Several major challengers have stepped forward recently to "duke" it out with the champ, though, and they must be taken seriously. This is particularly true of Borland's *Quattro* and Microsoft's *Excel*. Both come from respected companies capable of providing ongoing support for their products. Each accepts the Lotus standard as a given and builds on it in significant ways. I evaluated preview copies of both programs and feel the King of Spreadsheets now has some catching up to do.

QUATTRO: A LOT LIKE 1-2-3, AND MORE

The Borland entry will do everything Lotus 1-2-3 will do and more—at less than half the price (\$195).

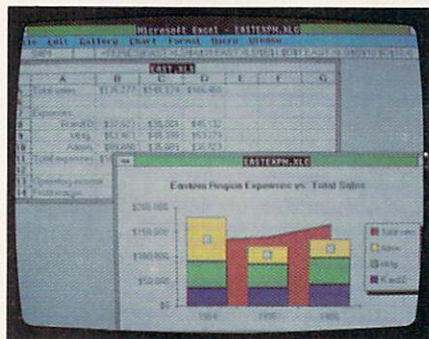
Quattro looks like your basic MS-DOS spreadsheet. A few lines of text have been changed, but current spreadsheet users will not feel they have been dropped into unfamiliar territory. The one difference that immediately catches your attention is the absence of the familiar two-line command bar. Instead, a window containing a menu of command options pops up on-screen when you hit the backslash (\) key. Select a category from this menu, and additional options pop up in another window.

Installing the program couldn't be simpler. Just copy all the files to your hard disk or to a working-copy floppy, and enter "Q" to start the program. The software automatically configures itself to your hardware, recognizing the proper display adapter and any expanded memory or math co-processors in your system.

Noteworthy Features. *Quattro* uses a technique called "minimal recalculation" to speed up operations. Tradi-

tional spreadsheets recalculate all the formulas in the worksheet when a single cell is changed. *Quattro* recalculates only those figures that are dependent on the changed cell. This produces substantial speed improvements, depending on the size of your model. Borland is not the only company following this sensible scheme, though—Microsoft, for example, also uses minimal recalculation in *Excel*.

Another helpful feature offered by *Quattro* is a macro recorder. Lotus 1-2-3 has traditionally required users



View *Excel*'s spreadsheet data and colored graphs on the same screen.

to build macros—a series of commands combined into one unit—by hand, entering macros in a separate section of the spreadsheet. In contrast, *Quattro* will record actions and commands and automatically store them in a macro.

One of *Quattro*'s most important capabilities for building macros is the extensive debugging function. There are few tasks more frustrating than trying to figure out where a complex macro went wrong. *Quattro* makes this much simpler by allowing you to single-step through your macro, seeing the result of each command as it is executed.

Quattro Advantages. Graphics is one area where *Quattro* stands head and shoulders above 1-2-3. The program will graph your data in 10 different formats, making the most of the colors provided by all the popular graphic adapters, including VGA.

There are 11 typeface choices for labels and a full range of customization options. Lotus 1-2-3 requires users to exit from their spreadsheet in order to print a graph—*Quattro* prints directly from the spreadsheet.

The software comes with three-part documentation. The *Getting Started* book includes a good tutorial section and a chapter, directed to 1-2-3 users, that points out the differences between the programs. *The User Guide* provides a comprehensive and comprehensible explanation of all program features, and the *Reference Guide* alphabetically summarizes all the menu commands and built-in functions.

Works with 1-2-3. Compatibility with the Lotus 1-2-3 standard is not an issue when considering *Quattro*. The program will accept both files and macros created using either Release 1a or 2.01 of 1-2-3. It will also write files in either format, so there is no reason a *Quattro* user can't work side-by-side with a 1-2-3 user and exchange data freely.

In some regards, *Quattro* reprises the limitations of the market leader. The maximum spreadsheet size is the familiar 8,192-rows by 256-columns, and the database functions are virtually identical to those in 1-2-3, which means it's not terribly impressive. Also, I miss having a simple Undo command. Overall, though, I could not find an area where the Borland product offers less than industry standard features, and its price/performance ratio is high indeed.

MICROSOFT EXCEL: POWER AT A PRICE

One of the biggest stories in personal computing these days is the acceptance of the Macintosh as a business machine, and Microsoft *Excel* was a major factor in starting this trend. Now those who remained true to Big Blue (or its countless clones) can stop gazing longingly at the Mac screen. The PC version of *Excel* has arrived, and it's a strong testimonial to the potential of a Windows-based environment.

STEVE MORGENSTERN is a contributing editor for FAMILY & HOME-OFFICE COMPUTING.

The path to a so-called "graphical interface" is not for those with shallow pockets or tight purse strings, though. *Excel* is one of the few products that requires at least a PC AT compatible or faster system, along with a hard disk. Make that a big hard disk, too, since the program files (complete with *Windows*) and all the tutorial files eat up about 5MB.

Microsoft has also taken the high road when it comes to pricing—*Excel* retails for \$495.

Happily, once you've cleared the hardware hurdles and parted with the hefty price, *Excel* delivers the richest environment available today for number crunching.

Noteworthy Features. One look at the screen and you're likely to echo Dorothy's words when she landed in Oz: "I have a feeling we're not in Kansas anymore." The screen is laid out Macintosh-style, with black-on-white type and menus along the top.

You can use *Excel* without a mouse—but I certainly wouldn't want to. Each command on the main menu bar or the individual drop-down menus has an underscored letter: F for File and E for Edit, for instance. To select a command, you hold down the ALT key and tap the appropriate letter. Fine as far as it goes. But instinct goes out the window when faced with several commands with the same first letter. File, Formula, and Format are all on the main menu. ALT-F accesses File, ALT-R gives you Formula, and ALT-T brings you to Format. The same confusion prevails throughout the multiplicity of program menus.

Similarly—using ALT-key commands—you can change the size of a window or adjust the width of a column or the height of a row. But to really feel the freedom involved in *Excel*, you need to move the on-screen pointer with a mouse and just put things where you want them. Want to make the window smaller? Grab the edge, and drag it over till it fits the way you want it. Column too narrow? Grab it, and widen it. It's fast, fun, and totally instinctive.

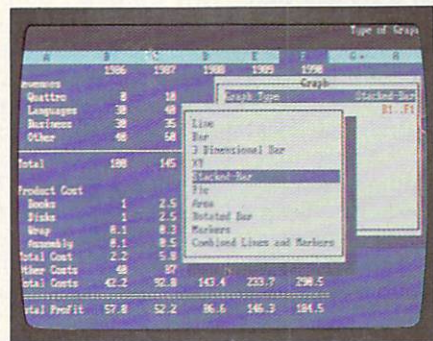
Excel Advantages. Many traditional spreadsheet limitations simply evaporate in this environment. Want to see two different spreadsheets at once—or three—or six? No problem. Just open the files, and arrange them the way you want.

Highlighting and emphasizing sections of the spreadsheet are further

strengths of this graphically based system. For instance, there's no reason to use just one typeface in your spreadsheet: mix boldface and italics for emphasis, if you like, and larger and smaller type sizes. You can create on-screen forms that look like forms—an invoice, for example, or a fully customized report.

A further example of the advantages of a graphic interface arises when constructing charts. *Excel* comes with 44 predesigned charts that can be refined to suit your needs. These charts are not only described, though; the program presents you with a gallery of thumbnail pictures of each chart type. Select the one you want, and your data is immediately rendered in that style. Not satisfied? Just click on another possibility, and the chart is redrawn.

More than 1-2-3. *Excel* has all the



Print up to 10 types of graphs directly from Quattro's competent spreadsheet.

mathematical muscle you could want, with 131 built-in functions. There are 12 built-in formats for numbers plus 9 time-and-date formats. If nothing there fits, you can define custom formats, streamlining entry of Social Security numbers or parts numbers, for example. If spreadsheet size is a factor, *Excel* delivers. The maximum worksheet dimensions (with lots of expanded memory, of course) are 16,384-rows by 256-columns.

A nontraditional approach to macros proves very successful in *Excel*. Most programs make macros part of an individual spreadsheet, recorded in some out-of-the-way group of cells. Like *Quattro*, *Excel* offers a macro recorder function and saves the macro definitions in separate macro sheets. That means you can use the same macros in any worksheet.

Excel lacks the powerful macro de-

bugging tool provided by *Quattro* (although there is a debugging macro in the supplied macro library). When it comes to debugging your worksheet itself, though, there are superb tools at your disposal. After you've selected a cell containing a formula, use the Show Info menu choice to list all cells that depend on that cell and all cells on which that formula is dependent.

Documentation is top-notch. It includes a *Getting Started* and *Quick Reference* booklet, a *Reference Guide*, a *Functions and Macros Guide*, and a *Sampler* providing practical ideas for employing the program's features. Two extensive on-line tutorials provide a very effective introduction and practical experience. The on-line help system is also first-rate.

Microsoft *Excel* is anything but another Lotus clone. At the same time, the 1-2-3 standard is acknowledged through compatibility; *Excel* will read and write 1-2-3 format files. Lotus macros require some conversion, but there is a built-in translation assistance function.

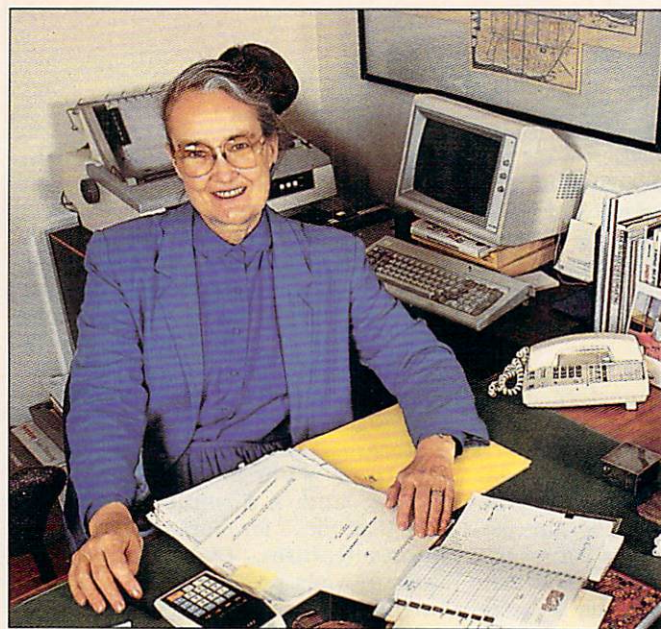
RECOMMENDATIONS

The apples-and-oranges factor is evident in comparing *Quattro* and *Excel*.

Quattro is a very capable spreadsheet that is close to the 1-2-3 standard, with a few notable improvements. If money is an issue, *Quattro* clearly shines. It will run perfectly well on an inexpensive system.

Excel is a different ball game—a power user's tool. Even if they were giving away the program, you'd need an expensive, hard-disk-equipped machine to run it. When coupled with *Windows 2.0* or higher, *Excel* can be part of a complete, integrated work environment. This is clearly the direction in which the IBM and compatibles world is headed—albeit following a path laid out by the Macintosh. It seems appropriate, and a little ironic, then that the program blazing the trail to widespread acceptance of a graphics-oriented environment in the IBM world is Microsoft *Excel*. (See the *Software Guide* on page 67 for *Quattro* and *Excel* specifications.)

NOTE: As these reviews went to press, another impressive new spreadsheet crossed my desk—Lucid 3-D. Look for a complete review of that program in an upcoming issue. ■



Q: I'd like to typeset via modem. Can you please tell me how to go about doing this? What type of software do I need? Can a Hayes-compatible modem do the trick, or do I need a Hayes model? What do I look for in a modem that will enable me to telecommunicate nationwide? Where can I learn the typesetting symbols and their meanings?

—C. PICKEL, Lebanon, Ohio

A: Your best bet for getting started is to first visit local typesetting houses. Look for them under "Typesetting" in your Yellow Pages. It's becoming common now for typesetting houses to hire freelance workers. Employers will be looking for fast, accurate typists. Some firms lend or lease computers to their home-based workers; all of them provide training, since the typesetting codes aren't entirely uniform throughout the industry.

Wait until you land a typesetting firm as a client before buying software. What you will need is a full-featured word-processing package, probably XyWrite, WordStar, WordPerfect, or Microsoft Word.

If you find that you need a modem (an alternative is to send disks from home to the type house), there are lots of choices. I recommend a Hayes or Hayes-compatible modem that transmits at 1200 baud or faster. High-end models have more features and are more resistant to noise on the telephone line; this results in fewer transmission errors.

One choice is PC 2400B, a modem from the direct-sales company PC's Limited (1611 Headway Circle, Bldg. 3, Austin, TX 78754; [800] 426-5150). For \$300, you get an internal modem for MS-DOS computers that will work at 300 baud, 1200 baud, and 2400 baud, depending on the speed of your client's receiving modem.

Or you could buy the top-quality Hayes 1200B, an internal modem for MS-DOS computers, which lists for \$489, but is currently discounted by dealers to about \$300. I bought my Hayes 1200B modem several years ago by mail order. Although I was nervous about installing it myself, I didn't encounter any difficulty.

The key to effectively using your modem lies in choosing the right software. I found my *Smartcom II*, which

JOANNE H. PRATT, president of Joanne H. Pratt Associates, Dallas, Texas, has 28 years of experience in operating home-based businesses. Her company conducts research and consults for private and government clients.

Home-Office SHOPTALK

AN EXPERT'S ADVICE ON STARTING, MAINTAINING, AND EXPANDING A HOME-BASED BUSINESS

BY JOANNE H. PRATT

came bundled with the Hayes modem, very awkward to use. The manual was overwhelming; as I fumbled through it, I became so afraid of telephone charges building up that I sent my files on disks by overnight mail.

But my recent switch from *Smartcom II* to *PereLine* (Peregrine Data Systems, Inc., 5365 Baron Dr., San Jose, CA 95124; [408] 356-6105; \$70) has changed me into an eager user of my previously idle modem. What I find so helpful about *PereLine* is its system of menus that pop up in multiple windows. The instructions lead me right through the sequence of setting up phone numbers and protocols so that I've only had to resort to the manual a few times.

For more information, refer to "Her Type of Business: How One Homemaker Set up a \$100,000-a-Year Typesetting Service in Her Basement" (see the *Home Office* department in the April 1987 issue).

Q: We are a retired couple, and each of us wants to separately set up a home-based business after we move into a new home. Can you give us some pointers on arranging our home office?

—V. and R. ELLIS, Tucson, Arizona

A: Unless you really want to become 24-hour roommates, I highly recommend setting up two separate offices—even if one office has to double occasionally as a guest room. Most couples who "office" together at home find that working within talking distance of a spouse means constant interruptions for help, advice, or chatter. That distraction, combined with noise from one spouse's telephone, computer, or printer, can be frustrating to the other spouse.

For help on furnishing your offices, *Working from Home* (by Paul and Sarah Edwards, Jeremy P. Tarcher, 9110 Sunset Blvd., Los Angeles, CA 90069; 1987, \$12.95) provides excellent tips for choosing the right spaces. Line drawings illustrate how to outfit your rooms with desks, storage boxes, and partitions, so that they serve well for business, and if necessary, other uses.

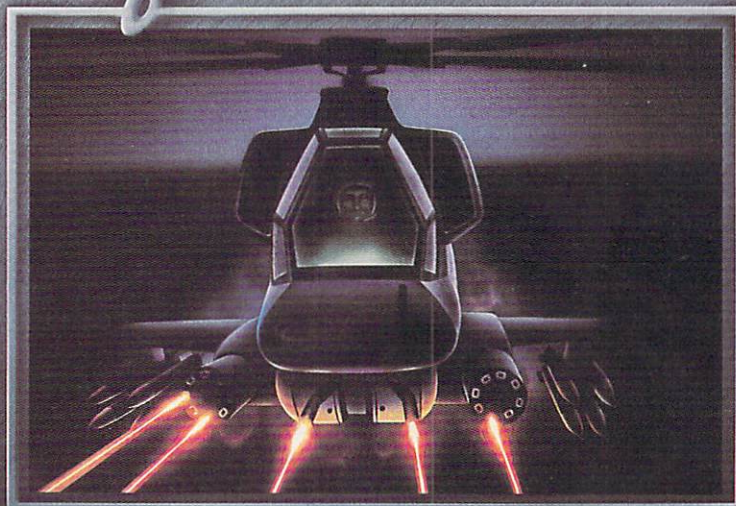
You also can find inspiration from the color photographs in *Sunset Home Offices and Workspaces* (\$6.95), published by Sunset Books in 1986.

You also will need to look into the local zoning code to find out which permits, if any, are required. ■

"You're pond scum, McGibbits!"

THE MAD LEADER

Infiltrator II



by Chris Gray

Fly your Gizmo™ DHX-1 Attack Chopper to three totally new, totally challenging ground missions. Can you hack it, Johnny "Jimbo" McGibbits?

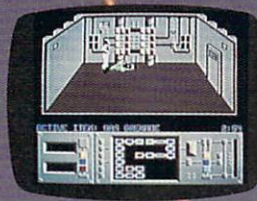


STICK IT TO THE MAD LEADER 3 NEW WAYS

Jimbo Baby McGibbits is back—in *Infiltrator II*—where you'll find two of the hottest action categories: combat helicopter simulation and three new military adventures.



Step into Jimbo Baby's boots and get back into the action—where action means neutralizing a deadly nerve gas, nullifying a few neutron bombs and subtracting one



Mad Leader from this old globe.

Feeling up to it, Jimbo? Or have those five course meals and fancy dolls turned your mind to mush?



M I N D S C A P E

Visit your retailer or call 1-800-221-9884 for VISA and MasterCard orders. To purchase by mail, send your card number and expiration date, check or money order for \$29.95 (Apple II family, IBM & compatibles and C64 & C128) plus \$3.00 handling to Mindscape, Inc., P.O. Box 1167, Northbrook, IL 60065. Allow 3-5 weeks for delivery. Lawyers like this part. © 1987 Mindscape, Inc. Mindscape is a trademark of Mindscape, Inc. Apple, IBM and Commodore are registered trademarks of Apple Computer, Inc., International Business Machine and Commodore Electronics, Ltd., respectively.

PRODUCT REVIEWS

EVALUATIONS OF COMPUTERS, PERIPHERALS, AND HOME-OFFICE EQUIPMENT

COMPUTERS

Blue Chip pcPopular Model 20

MANUFACTURER: Blue Chip
Electronics, Inc.

ADDRESS: 7305 West Boston Ave.,
Chandler, AZ 85226; (602) 961-1485

PRICE: \$1,195

In an aggressive effort to attract those purchasers who neither wish to pay for the "state of the art" in microcomputers nor need it, Blue Chip offers the pcPopular, a line of IBM PC clones with reasonable price tags.

LOTS OF EXTRAS, LOW COST

Since the pcPopular is a mass-market product, don't expect a lot of fancy footwork. While it is certainly a cut or two above many other PC XT clones, breathtaking it is not.

But the pcPopular Model 20 I tested was bundled with an impressive number of extras for an impressively low price. For \$1,195, you get 512K of RAM, a 360K 5.25-inch floppy-disk drive, a 20MB hard-disk drive, a standard AT-style keyboard, a mouse, a color graphics/monochrome graphics card, a real-time clock/calendar with battery backup, MS-DOS 3.2, GW BASIC, and GO! tutorial software. (Unfortunately, a monitor is not included with this \$1,195 unit.)

SETUP

Setup entails plugging in a few cables and booting up with the GO! disk in drive A. The two three-ring manuals give you all of the hardware information you'll need to set up the computer and begin. A thoughtful feature is the clear labeling of all of the rear-panel connectors and switches. One switch changes the processor speed (4.77MHz or 8MHz), and one selects either monochrome or RGB output.

There's also a reset button. The



pcPOPULAR SPECIFICATIONS

MICROPROCESSOR: 8088-2 (4.77/8MHz)
MEMORY: 512K, expandable to 640K on the motherboard
OPERATING SYSTEM: MS-DOS 3.2
BUILT-IN PORTS: parallel, serial, mouse, and game
EXPANSION SLOTS: Five full-size video (only one slot is free)
VIDEO MONITOR (not supplied): Amber (\$130), Green (\$100), RGB (\$350)
DISK DRIVES: 360K 5.25-inch floppy and 20MB hard disk
SOFTWARE INCLUDED: MS-DOS 3.2, GW BASIC, GO!, Logitech Mouse driver, Disk-based Diagnostics
LIST PRICE: \$1,195

IBM PC and most clones require that you turn the computer off and on again to recover from a keyboard lockup. But there's no need to jolt the electronics if you have a "hard reset." Good move.

Not such a good move is Blue Chip's use of the rear-panel keyboard connector. IBM started this "standard," and most clone manufacturers have gone along with it. The connector should be on the front panel (as it is on Epson, Leading Edge, and Vendex machines), where it is least likely to be subjected to stress and strain. Why take the cable through three bends if it really isn't necessary?

PERFORMANCE

As for the performance of the model I tested, no surprises cropped up at either normal speed (4.77MHz) or turbo speed (8MHz). To determine its reliability, I left the system running—morning and night—for an entire week. It neither overheated nor glitched in any way.

In addition to running the supplied software, I tested a range of IBM software demanding IBM compatibility. Nothing failed to work—database managers, utilities of all kinds, word processors, spreadsheets, programming languages other than BASIC, or games. There may be programs out there that won't run the way they should, but I haven't found any.

All ports—printer, serial, game, and monochrome video (I used a Zenith monochrome monitor)—worked normally. The mouse, which I tested with *PC Paintbrush*, also worked well. However, I wasn't wild about the way the mouse—a flat, angular unit—felt, though I had no complaints about its functionality. The mouse software includes menu installations for a number of pieces of popular software and the capability of custom designing menus for just about any software.

I was impressed with the GO! software, a graphically attractive DOS shell that leads the user through various software activities—word processing, data management, and so on. GO! is a great anxiety reducer for newcomers to computing.

What I liked least about the pcPopular was its keyboard. All the keys were where they should have been, but their feel was mushy. I preferred a snappier, "clickier" feel. If I were buying the pcPopular, I'd soon have to buy a new keyboard.

This computer should be looked at closely by anyone who wants to step into the PC-compatible world and wants to do so at a modest cost. It will do everything you expect an IBM compatible to do and can be easily modified. For a modest initial invest-

ment, you get a reliable, albeit somewhat old-fashioned computer that can be souped up as your computing requirements change.

—HENRY BEECHHOLD

CIRCLE READER SERVICE 100

Tandy 1000 TX

MANUFACTURER: Tandy Corp.

ADDRESS: One Tandy Center, Fort Worth, TX 76102; (817) 390-3700

PRICE: \$1,199

While Tandy gave its 1000 HX computer the pizzazz (see review in the January issue), the company granted the HX's cousin, the 1000 TX, the raw speed and the power. The TX, the top of Tandy's 1000 line, uses the Intel 80286 microprocessor. Although the machine has a 286 microprocessor, it isn't truly an AT compatible; because it's not a 16-bit machine, the HX runs slower than other 286 computers—but faster than Intel 8088-based PC and XT compatibles.

The machine comes with 640K of RAM and has five 10-inch expansion slots. (The success of the original Tandy 1000 has made third-party support profitable so there are a number of expansion boards that fit this shorter format.)

The TX uses the higher capacity



TANDY 1000 TX SPECIFICATIONS

MICROPROCESSOR: Intel 80286 (4/8MHz)
MEMORY: 640K, expandable to 768K (640K for MS-DOS; 128K for video memory) on the motherboard

OPERATING SYSTEM: MS-DOS

BUILT-IN PORTS: Parallel, serial, monochrome/color graphics adapters, composite video, two joystick, headphone
EXPANSION SLOTS: Five 10-inch expansion slots (8-bit)

DISK DRIVES: One 720K 3.5-inch disk drive

SOFTWARE INCLUDED: MS-DOS 3.2; GW-BASIC; Personal DeskMate 2

LIST PRICE: \$1,199

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PRODUCT REVIEWS

720K 3.5-inch drives, though it comes with only one. That's actually a good idea since the machine can take either a 5.25-inch drive, another 3.5-inch one, or a hard-disk drive. If you decide on a hard drive, you'll need a hard-disk drive controller card to install it. If the TX is a step up in power from an earlier MS-DOS machine, installing a 5.25-inch drive as the second drive allows you to use the programs that still aren't available in the smaller format.

Personal DeskMate 2 comes bundled with the machine. It uses the Macintosh/Windows/Presentation Manager style graphic interface with pull-down menus, icons, and dialog boxes. In addition to the *Text*, *Filer*, *Spreadsheet*, *Telecom*, and *Paint* programs, there is a snazzy music composition program that takes advantage of the three-voice chip.

All in all, the 1000 TX is a solid, fast, and affordable mid-range machine. Even though it doesn't come with a monitor, (an RGB monitor costs about \$300), it's still a nice value in Tandy's tradition.

—STEPHEN MILLER

CIRCLE READER SERVICE 101

PERIPHERALS

Brother M-1724L Text-Graphics Printer

MANUFACTURER: Brother International Corp.

ADDRESS: 8 Corporate Place, Piscataway, NJ 08855; (201) 981-0300

HARDWARE REQUIREMENTS: IBM PC or Macintosh

PRICE: \$899

In the not-so-distant past, it seemed hard enough to find a printer that worked with my computer and software. Today, buyers like me can insist on much more—namely speed, versatility, ease of use, and good value. A printer like the Brother M-1724L serves well those who dream of faster printers with better print quality but don't want to pay the price for it.

Because the M-1724L uses a 24-pin printhead instead of a 9-pin (which you're probably more accustomed to), it takes only one pass to make fairly sharp near-letter-quality characters. And that, of course, means speed—up to 216 characters per second (cps) in elite draft mode.

(Letter-quality printouts, of course, are much slower.)

Among the type sizes and styles the M-1724L prints in are pica, elite, enlarged, emphasized, condensed, superscript, double strike, underlined, and near-letter quality. With a 16.5-inch-wide carriage, the printer accepts several paper sizes and has both a continuous and a friction paper feed. Unfortunately, while printers such as the Epson LQ-850 will automatically roll back the continuous feed and roll in the single sheet, the M-1724L requires that you do this manually.

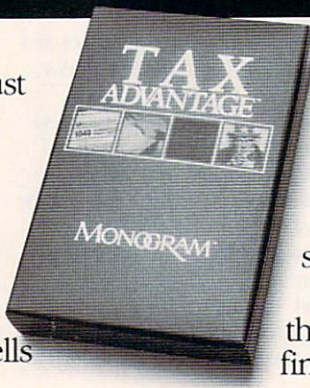
An attractive display panel in the front of the machine makes controlling the printer a breeze. The printer's three emulation modes are Epson, IBM, and Diablo/Brother HR Series, selected through DIP switches. To get to the DIP switches, you have to open up the cover and reach down below the printhead. For some, this may be an uncomfortable thought.

When a printer is as versatile as the M-1724L, a manual explaining all the options is crucial. Brother's manual is complete and easy to un-

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MONOGRAM

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derstand; there's no index, but the table of contents is fairly complete.

The M-1724L is an attractive, solidly constructed, and relatively quiet printer, thanks to the foam strips underneath the printer that absorb vibrations. Both serial and parallel ports are located on the left side of the printer, and the power cord is on the right side. While this is certainly more convenient and less cumbersome (you're less likely to get your paper tangled up with the power cord and printer cable), it also requires more desk space than you may be willing or able to part with.

—LINDA WILLIAMS

CIRCLE READER SERVICE 102

HOME-OFFICE EQUIPMENT

The AP2002 Name-Dialer Telephone

MANUFACTURER: Colonial Data Technologies, Inc.

ADDRESS: 80 Pickett District Road, New Milford, CT 06776; (203) 355-3178

PRICE: \$180

Early auto-dial phones relied on

hand-written charts—or your memory—to link code numbers to names. The recently introduced CDT Model AP2002, however, comes with an alphabet keyboard next to its numeric keypad. The keyboard is used to store names—whether actual or code—with accompanying numbers.

The advantage is that you don't have to wonder whether it is your best client who's 01 and your best friend who's 02 or vice versa—you just type in names. In fact, in most instances, you'll only need to type in the first three letters of a name (for example, SAM for SAMUELSON). The AP2002, which comes in al-



The AP2002 Name-Dialer Telephone stores up to 200 names.

mond and gray and uses two alkaline C batteries, will store 200 such name-number combinations, with names of up to 16 characters and numbers of up to 32 digits.

The AP2002 has a number of other attractive features: two-line input with hold and conference buttons; a better-than-average speakerphone, with volume control, for hands-free conversation; a mute button for privacy; redial with a one-minute redial option; ring, hold, and in-use lights; and a clock, timer (for measuring the length of time you've been on the phone), a high-low ringer, a flash button (for disconnecting without hanging up or for accessing a PBX), and a pulse-tone control switch. (A one-line, 130 number model, the AP2001, lists for \$130.)

And programming the AP2002 is fairly straightforward, though there are errors in the owner's manual that tend to complicate matters. Still, after a couple of weeks' use, the AP2002 will relieve you of the burden of using a Rolodex, code numbers, or—heaven forbid—your memory.

—MARK BITTMAN

CIRCLE READER SERVICE 103

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USING HYPERCARD

EVERYONE'S FIRST SCRIPT

How to Connect Cards with the Press of a Button

BY JOHN J. ANDERSON

The phenomenal rate at which the supply of *HyperCard* stackware is growing has surprised even its enthusiasts.

What is the reason for this?

Well, think about this: Stacks build beautifully upon each other since *HyperCard* is extremely modular. One card, one button, one field, one script, or a portion of that script, can be ported to any other stack with a quick copy-and-paste sequence.

Last month we took our first look under *HyperCard*'s hood. We saw how the straight-shooter qualities of the HyperTalk language make creating scripts in it inviting since the lines are stated in plain English. Scripts tell *HyperCard* what to do, and this time around we'll look at linking cards and buttons on the fly, without actual scripting—and then we'll take the plunge with a HyperTalk script that adds exciting special effects to a link between two cards.

LINKS IN THE CHAIN

HyperTalk is interwoven so ingeniously into *HyperCard* that the HyperTalk programming environment can work for you as automatically and intelligently as possible. Perhaps the clearest example of this is in linking cards with buttons.

One of the first actions you'll ever want to make in creating your own stacks is to construct a button, so that when that button is pressed, you proceed to a preselected card in the stack. Let's move through the steps that accomplish this.

1. First you need to create at least a couple of cards. To do this you'll have to be set to the painting, authoring, or scripting level of *HyperCard*. You can select your user level from the User Preferences card in the Home stack, the last card in that stack (type GO TO THE LAST CARD or GO LAST in the message box). For now, set your level to "Scripting."

2. Now select "New Stack" from the File menu. When *HyperCard* prompts you for a stack name, type MY FIRST STACK or anything else you

JOHN J. ANDERSON, a regular contributor to FAMILY & HOME-OFFICE COMPUTING, started Acme Dot Company, which makes *HyperCard* stackware.

Proportion Wheel 2.1

By André Hinds
for Fanques, Inc.



Converter



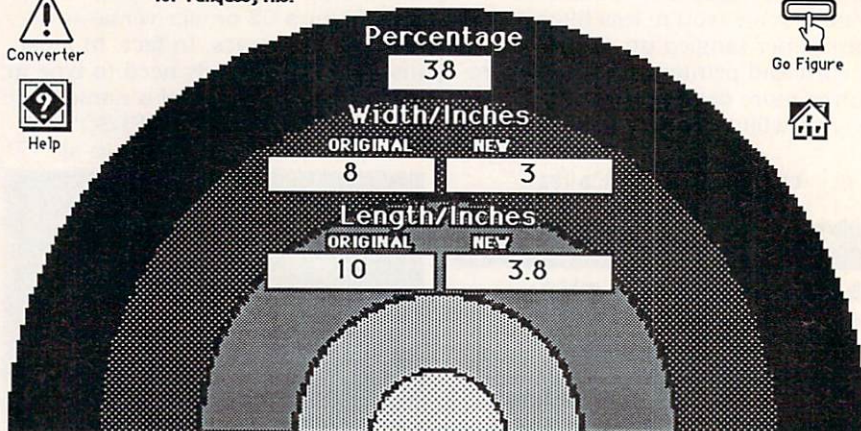
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Go Figure



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like (up to 31 characters with no colons, ";"). You'll also notice a check box called "Copy Current Background," which is the default mode. Click on it to turn it off and give yourself a new blank page.

3. Next, choose a paint tool from the Tools menu. Notice how, if you continue to pull down the menu, the tool-palette box will "tear off" the menu bar. Now you can place it wherever you like. Choose your favorite paint tool—the pencil, paintbrush, spray can, or a shape—and paint whatever you'd like.

4. When you're ready to create another card, select "New Card" from the Edit menu. You may create as many cards as you like in this new stack, but for our purpose here only two are necessary. You can look through a stack of cards by selecting "Next" and "Prev" from the Go menu, by pressing the right and left arrow keys, or—especially for those who have an older Mac without arrow keys—you can flip between cards by pressing COMMAND-3 and COMMAND-2.

5. Now you want to link these cards by creating a button on one that will move you automatically to the other. Select the oblong button tool from the Tools menu. Then choose "New Button" from the Objects menu. A

rectangular button that reads "New Button" will appear on your current card. You may now move and alter the size of the button with the mouse.

6. By double-clicking on the button, you automatically bring up its information box. Here you can name the button and select its look and properties, such as an icon.

7. To link a button with a card, you need only to click on the "LinkTo..." button in the information box. You then shuffle through all the cards in your stack until you get to the card to which you wish to link. Click on "This Card" in the answer box, and your link is complete. It's really that simple.

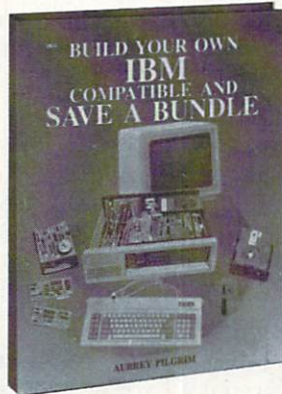
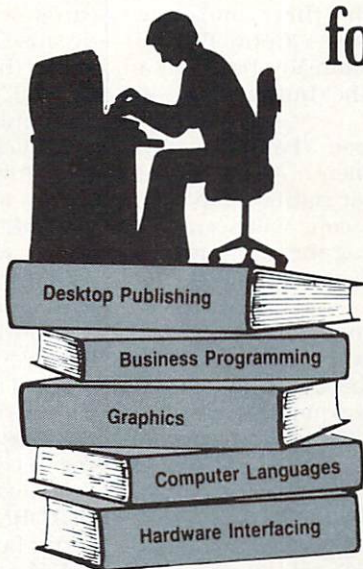
8. Now bring up the button's information box again. Below the "LinkTo..." dialog button is a "Script..." button (that leads to the script box). If you click on it, you should see something like this:

```
on mouseUp  
  go to card id 12345  
end mouseUp
```

HyperCard has created a link between your new button on one card and any other card to which you'd like to move. *HyperCard* has also automatically "written" a corresponding HyperTalk script that means—in even plainer English—when you click

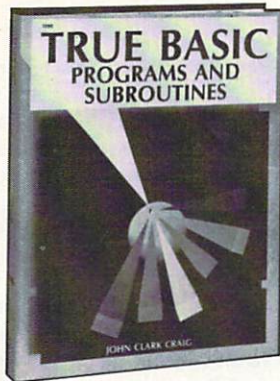
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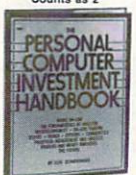
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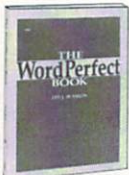
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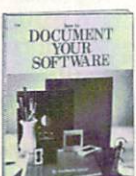
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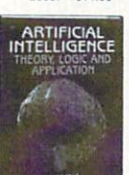
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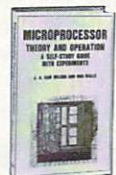
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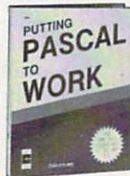
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USING HYPERCARD

on the button with your mouse ("on mouseUp"), you go to the card that's identified with number 12345. And "end mouseUp" indicates to HyperTalk the end of the script that began with your click. You need not concern yourself with the card's numeric code—its number will drop directly into your HyperTalk script.

9. Return to the Tools menu and select the *browse* tool (the pointing finger cursor). Bring the cursor to your new button and click. You will immediately move to the exact card you selected.

Although the details of HyperTalk may still elude you, you have successfully created a HyperTalk script!

CLONING BUTTONS 1-2-3

You can make your own version of that linking script—and you need not make it from scratch but from modular *HyperCard* parts instead. It's just as easy as letting *HyperCard* write it automatically, albeit with a few more steps—but in trade you'll get to jazz up the link with a visual, "movie-like" special effect.

1. Go back to the card in your stack with the button created in step 5 earlier. Activate button mode by clicking on the torn-off Tools menu.

2. Click on your button, and it shimmers with the "marquee" around it. Choose "Copy Button" from the Edit menu. You have put an exact copy of the button into the Mac's memory.

3. Then choose "Paste Button" from the same menu. A copy of that button will appear right on top of the first button; the copy will seem as if it's not there. Drag the new button to the side, and you should now see two buttons.

You have cloned a button. Any *HyperCard* object—whether button, field, card, or background—can be copied and subsequently moved to any other card or stack by following similar steps.

BUTTONING THINGS UP

Now we're going to add that promised special effect, and at the same time see what it's like to write our own scripts.

1. Double-click on your newest button. At the top of the information box is a text field called "Button Name." It should say "New Button." Naming buttons is not mandatory, but go ahead and give it a new name anyway. It's good to get in the habit of naming all your buttons—and other

HyperCard objects such as fields and cards—even if the names won't show, because as you advance in HyperTalk skills, the name will let you more easily "call" the object when you need to manipulate it in a script.

2. Click on the "Script . . ." button to bring up the script box. In it, there's already a short snippet of HyperTalk! Look familiar? This tiny script was generated automatically when you linked your first button with a card. When you pasted the new button, its script was also copied from your first button.

3. Let's talk HyperTalk, and modify this script. With your mouse, drop the cursor down to the beginning of the second line of the script. Type VISUAL EFFECT DISSOLVE, then press RETURN. Now click on "OK" in the script box.

4. You are now programming in HyperTalk. So, before you do anything else, double-click on the new button while holding down the SHIFT key. This maneuver skips the button information box and goes directly to the script box, which should read (only the number is different):

```
on mouseUp
  visual effect dissolve
  go to card id 12345
end mouseUp
Now click on "OK."
```

5. Reset to the browse mode by choosing the pointing finger from the tools palette. Click on the new button. Now, instead of a direct cut from card to card, your card with the buttons dissolves smoothly to the original linked card. Most people find the effect very attractive.

Eight separate types of visual effects in moving from card to card are available in HyperTalk: zoom, iris, barn door, wipe, scroll, dissolve, checkerboard, and venetian blinds. Additionally, the speeds and directions of these effects are variable, resulting in a full complement of "cinematic" tools. We'll go into more detail in an upcoming column, but for now try these substitutions in your script:

```
visual effect zoom open
visual effect wipe left
visual effect scroll up
```

Note that visual effects are not only for fun. They have a unifying purpose and significance in a stack. For instance, you might want all help cards to "zoom open," which gives the user a sense of moving to a new level. Or the turning pages of a book could be simulated by a "wipe left" effect.

See you next time. ■

STACKS OF THE MONTH

Note: All stacks on CompuServe (CIS) will be found in the new *HyperCard* Forum (STACKWARE). All stacks on GEnie will be found in the Macintosh RoundTable, Library 15. The exact name under which the stack is filed can be found at the end of each description.

Proportion Wheel 2.1 helps desktop publishers scale photographs or illustrations for professional printing. For example, say you have an 8-inch by 10-inch photograph that needs to be reduced to fit in an approximately 3-inch by 4-inch box on the page. Simply tell *Proportion Wheel* three of the following four specs—the photo's original width, new width, original length, and new length. In this case it would tell you the photo would actually need to be sized to fit either a 3.2-inch by 4-inch box or a 3-inch by 3.8-inch box to maintain its original proportions. If that size box is too big for your page, you could easily try other figures. Measurements can be in picas (one pica equals 6/72-inch) as well as in inches or a mix of the two. (*Proportion Wheel* lets you know that "It is customary to measure width in picas and length in inches, but you are not held to those traditions.") *Proportion Wheel* shows how practical *HyperCard* applications don't have to take up much space—the graphically attractive stack consists of only one card. Less than 9K on-line, so it's

a short download. Public Domain (free); all rights reserved. By André Hinds for Fanques, Inc., Box 3271, Tulsa, OK 74101 (CIS: 71510.262; GEnie: A.HINDS). Available on CIS, in DL 8 (PRWHL2.SIT); GEnie (PROPORTION WHEEL 2.1).

Now that spring training is here again, fans will want to browse through the **1987 Baseball Stat Stacks**. It brings baseball cards to life with complete, interactive statistics from last season. Four stacks come in the set: National League hitters, National League pitchers, and one of each for the American League. Each card in each stack represents one ballplayer and contains complete season stats. By doing multiple sorts through the data, you can uncover information that's potentially unavailable elsewhere. For instance, you could sort the stack by both position and slugging percentage to see who the best sluggers are at each position. These stats are so useful that the agent for Mike Schmidt—the Philadelphia Phillies' future Hall of Famer—purchased a set of them to use in negotiating contracts for more than 30 players, including Schmidt. In addition to *HyperCard* stacks, the stats are available in formats compatible with *Excel*, *OverVue*, *Filemaker Plus*, *Reflex*, and *dBase III Plus* (MS-DOS). \$20 (\$15 for 1986 stats; \$30 for both years). Available from SportsWare, (408) 842-0190.

SOFTWARE GUIDE

Welcome to FAMILY & HOME-OFFICE COMPUTING's Software Guide. The following table relates to the review charts that follow. It lists the various types of computers as designated under "hardware requirements" (and other hardware designations throughout this issue), the models included under each designation, and the minimum memory requirement (unless otherwise indicated).

DESIGNATION	MODELS	MINIMUM MEMORY
Amiga	500, 1000, 2000	512K
Apple	II, II Plus, IIe, IIc, IIGS (in IIe/c mode)	48K
64K Apple	II Plus, IIe, IIc, IIGS (in IIe/c mode)	64K
128K Apple	IIe, IIc, IIGS (in IIe/c mode)	128K
Apple IIGS	IIGS only	512K
Atari	800, 600XL, 65XE, 130XE	48K
Atari ST	520ST, 1040ST, MegaST	512K
C 64/128	C 64, C 128 (in 64 mode)	64K
IBM PC	PC, XT, AT, PS/2, and compatibles	256K
Macintosh	128K, 512K, Plus, SE, II	128K
Tandy CoCo	2, 3	64K

Please note: All Apple designations (except for IIGS) include compatibles such as the Laser 128 or Franklin 2100. Titles listed for the IBM PC will also run on most IBM PC compatibles (as well as on the IBM PS/2 series); check with the program's publisher or dealer for compatibility. Any additional hardware listed is required unless noted as "recommended" or "optional." In many cases, "2nd drive" refers to either a floppy-disk drive or hard-disk drive. Key: **O** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions that accompany a program. **EH** = Error Handling, the software's capacity to accommodate errors made by the user. **PS** = Play System (in the Entertainment reviews), the quality of the game's design and its playability. **GQ** = Graphics Quality, evaluated in light of each model's graphics capabilities. **EU** = Ease of Use after the initial learning period; varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

BUSINESS & PRODUCTIVITY

Title Publisher Price	Brief description	Hardware required	CP	O	D	EH	GQ	EU	V
BYLINE Ashton-Tate Corp. 20101 Hamilton Ave. Torrance, CA 90502 (213) 329-8000 \$295 ©1987	Desktop publishing particularly well-suited for MS-DOS computers, since it's run solely with the keyboard—no mouse. Do electronic "pasteup" as you combine text (created with your word processor or the built-in editor) and graphics. Recommended.† —HUNT	384K IBM PC. 512K recommended. 2nd drive. CGA, EGA, or Hercules.	N	★	★	★	★	E	★
DAYFLO TRACKER DayFlo Software 17701 Mitchell Ave. N. Irvine, CA 92714 (714) 474-1364 \$100 ©1987	A big database (occupies more than 900K of disk space) that can store up to 16 pages of data divided among any number of fields. Appropriate for tracking everything from due bills to investments and deductible expenses, but the hard drive requirement is a limitation for some people. —BRYAN	384K IBM PC. Hard-disk drive.	N	★	★	★	★	E	★
DOS RX Timeworks, Inc. 444 Lake Cook Road Deerfield, IL 60015 (312) 948-9200 \$60 ©1987	Memory-resident (meaning always accessible) DOS utilities, for such tasks as copying files, combined with nonresident DOS tools, for such chores as recovering from accidental hard-disk formats. Useful, but incompatible with graphics-based programs. —CAMPBELL	IBM PC.	N	★	★	★	N/A	A	★
GEOPUBLISH Berkeley Softworks 2150 Shattuck Ave. Berkeley, CA 94704 (415) 644-0883 \$70 ©1987	Desktop publishing for the C 64 reaches new heights with this GEOS-based package. Lets you set up master layouts that are easy to reuse with various jobs, and it reflows text around newly inserted graphics. Includes a text editor, preview mode, and more.† —HUNT	C 64/128. Mouse or joystick. GEOS 1.2.	Y	★	★	★	★	A	★
INSTANT PAGES Electronic Arts 1820 Gateway Dr. San Mateo, CA 94404 (415) 571-7171 \$50 ©1987	Simplified desktop publishing that offers efficiency instead of elegant type fonts or graphics. Good for such items as all-text newsletters, but the "graphics" are created one character at a time. Not professional, but for its price, does a bang-up job. —SUMMERS	IBM PC (320K with DOS 3.0 or higher). 2nd drive, mouse optional.	N	★	★	★	O	E	★

RATINGS KEY **O** Overall performance; **D** Documentation; **EH** Error-Handling; **GQ** Graphics Quality; **EU** Ease of Use; **V** Value for money; **O** Poor; **★** Average; **★★** Good; **★★★** Very Good; **★★★★** Excellent; **N/A** Not applicable; **E** Easy; **A** Average; **D** Difficult; **CP** Copy Protected, yes or no; **†** Longer review follows chart

BUSINESS & PRODUCTIVITY											
Title Publisher Price	Brief description	Hardware required	CP	Ratings							
				O	D	EH	GQ	EU	V		
MICROSOFT EXCEL Microsoft Corporation 16011 N.E. 36th Way Redmond, WA 98052 (206) 882-8080 \$495 ©1987	The PC version of <i>Excel</i> may have all you ever wanted from a spreadsheet—if you have enough hardware to support it. The smoothly done graphical interface is a delight to operate, and it's functional, too. (See longer review in features section.) —MORGENSTERN	640K IBM PC AT; IBM PS/2 Models 50, 60, 80; Compaq 286 or 386 Deskpro. Hard-disk drive. DOS 3.0 or higher.	N	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★		
QUATTRO Borland International 4585 Scotts Valley Dr. Scotts Valley, CA 95066 (408) 438-8400 \$195 ©1987	Will do everything Lotus 1-2-3 can do, along with several extra capabilities, yet it costs less than half the price! Also allows you to import 1-2-3 worksheets and to create new worksheets compatible with 1-2-3. (See longer review in features section.) —MORGENSTERN	384K IBM PC. 2nd drive. DOS 2.0 or higher.	N	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★		
READER Infob P.O. Box 37745 Honolulu, HI 96837 (808) 538-3111 \$70 ©1986	Do you often need to read text files on disk without altering them? Then take a look at <i>Reader</i> , which displays text in the often-more-legible "reverse video" (dark letters against a light background, just like real pages). Doesn't do anything else, though. —ROTTENBERG	IBM PC.	N	★ ★	★ ★	★ ★	★ ★	A	★ ★		
RECORD HOLDER PLUS Software Discoveries, Inc. 137 Krawski Dr. South Windsor, CT 06074 (203) 872-1024 \$70 ©1987	Multiple-choice, plain-English commands for creating records make this flat-file database a welcome, economical choice. Yet some problems when printing put a damper on my full appreciation. Still, it's useful for both small businesses and busy families.† —NOVAK	512K Macintosh. 2nd drive recommended.	N	★ ★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★		
SOFTWOOD GS FILE SoftWood Company P.O. Box 90331 Santa Barbara, CA 93190 (805) 964-8622 \$100 ©1986, 1987	Makes creating and maintaining databases almost fun with its mouse-driven, pull-down menu interface. Includes such helpful features as predefined fields (such as Phone or Date), two on-screen views (list or column), and a report function.† —ZORNBERG	Apple IIgs. 2nd drive optional.	N	★ ★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★		
VARSITY SCRIPSIT Tandy Corp. One Tandy Center Ft. Worth, TX 76102 (817) 390-3700 \$100 ©1987	This latest incarnation of the venerable word processor doesn't skimp on features: It includes a spelling checker and the capability to generate a table of contents or index. Some flaws, such as no permanent default drive for files, disappointed me, but it's solid overall. —MILLER	IBM PC, Tandy 1000 series. 2nd drive optional.	N	★ ★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★		
VIZAWRITE DESKTOP Progressive Peripherals & Software 464 Kalamath St. Denver, CO 80204 (303) 825-4144 \$150 ©1987	Half word processor, half desktop-publishing program—all with some real pluses, such as resizing and repositioning images and automatically transforming those images into a gray scale for printouts. But it can't process text in columns, and it comes with only the standard Amiga workbench fonts. —SUMMERS	Amiga. 2nd drive optional. <i>KickStart 1.2</i> or higher.	N	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★		
EDUCATION & CREATIVITY											
CRYSTAL PAINT Great Wave Software 5353 Scotts Valley Dr. Scotts Valley, CA 95066 (408) 438-1990 \$80 ©1987	Kaleidoscopic effects come to life with a drawing program that makes it easy to create ornate designs reminiscent of the art of M.C. Escher or the tapestries and rugs of the Middle East. It can even draw by itself. Fun, but too pricey for what you get. —LATIMER	512K Macintosh. Printer optional.	N	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★		
POSTCARDS Activision 2350 Bayshore Parkway Mountain View, CA 94043 (415) 960-0410 \$25-\$30 ©1987	Two purposes here: To make comic cards to send to friends or for a business to design notices to send to customers. Comes with dozens of graphics (some quite bizarre), 25 blank postcards, and a glue stick. A central menu makes it exceptionally easy to use. —ODISIO	Reviewed on C 64/128. Also for 128K Apple, IBM PC. Clip-art version for Apple IIgs, Macintosh.	N	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★		
SELECTRIP SelecTrip, Inc. 2443 Fair Oaks Blvd., #335 Sacramento, CA 95825 (916) 424-1277 \$49 ©1987	As a vacation planner, this program is a good idea with a major flaw: The travel data is based on specific tours, not general information about countries. Thus, large gaps riddle the data, even though it touts a file base of about 2,500 tours. —ROTTENBERG	IBM PC. 2nd drive, color monitor, printer optional.	N	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★		
RATINGS KEY O Overall performance; D Documentation; EH Error-Handling; GQ Graphics Quality; EU Ease of Use; V Value for money; P Poor; ★ Average; ** Good; *** Very Good; **** Excellent; N/A Not applicable; E Easy; A Average; D Difficult; CP Copy Protected, yes or no; † Longer review follows chart											

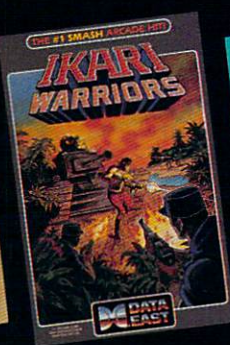
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EDUCATION & CREATIVITY

Title Publisher Price	Brief description	Hardware required	CP	Ratings						
				O	D	EH	GQ	EU	V	
SUPERPRINT Scholastic Software 730 Broadway New York, NY 10003 (212) 505-3000 \$50 ©1987	From the small (miniature designs) to the large (giant posters) to various sizes in between, <i>SuperPrint</i> brings new meaning to the term <i>printout</i> . Lots of extras here, such as a preview mode for large creations and a library of more than 200 graphics.† —SOLOMON	Reviewed on 128K Apple. Also for IBM PC. 2nd drive recommended. Mouse optional.	Y	★	★	★	★	E	★	★
VIDEO TITLE SHOP Datasoft/IntelliCreations 19808 Nordhoff Place Chatsworth, CA 91311 (818) 886-5922 \$30-\$40 ©1987	Are your homemade videotapes missing something? Sure they are—credits! Design the lettering and visual effects (such as scrolling) with your computer, play it on your monitor, then record with your VCR. Not easy to use, but effective if you're patient. —ODISIO	Reviewed on C 64/128. Also for 64K Apple, 128K Apple, Atari. Joystick optional. VCR required.	Y	★	★	★	★	D	★	★
WHAT THEY DON'T TEACH YOU AT HARVARD BUSINESS SCHOOL Reality Technologies, Inc. 3624 Market St. Philadelphia, PA 19104 (215) 387-6055 \$50 ©1987	A simulation that spans the course of 25 years and has you employ networking, negotiating, and managing techniques to get ahead in business, with "coaching" along the way from agent Mark McCormack. Some helpful information here, but too much is banal or superfluous (such as, "No wimpy handshakes"). Do you truly need software to tell you this? —COLE	512K IBM PC. 2nd drive. Hard-disk drive recommended.	N	★	★	★	★	A	★	★
ENTERTAINMENT			CP O D PS GQ EU V							
BOULDER DASH CONSTRUCTION KIT Epyx, Inc. 600 Galveston Dr. Redwood City, CA 94063 (415) 366-0606 \$25 ©1987	One of the best arcade/strategy games around continues with 15 brand-new screens (which are caves you mine) and a simple-to-use, menu-driven, construction kit for building your own screens. The hidden power of the construction set makes this package more than just " <i>Boulder Dash III</i> ."† —LANGENDOEN	Reviewed on 64K Apple. Also for Atari, Atari ST, C 64/128, IBM PC. Joystick, color monitor optional.	Y	★	★	★	★	E	★	★
GO Infinity Software 1144 65th St., Suite C Emeryville, CA 94608 (415) 420-1551 \$40 ©1987	The ancient Chinese board game has been so well adapted to the computer that it's versatile enough to be enjoyed by both novices and experts to Go. Not only can you play against the computer, but also—with a modem—against a person in another location.† —DONAHUE	512K Macintosh. 800K drive.	N	★	★	★	★	A	★	★
SEARCH AND DESTROY Broderbund Software 17 Paul Dr. San Rafael, CA 94903 (415) 492-3500 \$15 ©1987	Intense play action marks this submarine-hunting game, as you command a destroyer on the lookout for enemy vessels. Set your ship's speed, course, sonar settings, depth of detonation for depth charges, and more. Weak graphics and sound, however. —DELSON	IBM PC. CGA or Hercules. Joystick optional.	Y	★	★	★	★	A	★	★
SKI CRAZED Baudville 5380 52nd St., S.E. Grand Rapids, MI 49508 (616) 698-0888 \$30 ©1987	After the thrills—in the form of ski jumps, ice patches, slalom flags, and moguls (small mounds of snow)—the chills set in, and the action cools down. The main problem is that all 15 slopes are too easy to navigate. The game needs more variety, too. —LANGENDOEN	64K Apple. Joystick.	Y	★	★	★	★	E	★	★
STREET SPORTS BASKETBALL Epyx, Inc. 600 Galveston Dr. Redwood City, CA 94063 (415) 366-0606 \$40 ©1987	Unlike an organized game, "pickup" basketball can be played in many venues—school playground, back alley, suburban street, or parking lot. Those are just some of the choices in this fast-paced sports simulation, where even klutzes like me can win. —DELSON	Reviewed on C 64/128. Also for Amiga, 64K Apple, IBM PC. Joystick(s).	Y	★	★	★	★	A	★	★
TEST DRIVE Accolade, Inc. 20813 Stevens Creek Blvd. Cupertino, CA 95014 (408) 446-5757 \$30-\$45 ©1987	It's too bad the challenges are limited as you drive one of five exotic sports cars. While the graphics are great to look at, they're not always accurate (for example, all accidents, including blown engines, result in a broken windshield). —TORRES	Reviewed on Amiga. Also for Atari ST, C 64/128, IBM PC.	Y	★	★	★	★	D	★	★

RATINGS KEY O Overall performance; D Documentation; PS Play System; GQ Graphics Quality; EU Ease of Use; V Value for money; ★ Poor; ★ Average; ★★ Good; ★★★ Very Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; CP Copy Protected, yes or no; † Longer review follows chart

SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 67 for information such as copy protection and addresses of software publishers.

BUSINESS & PRODUCTIVITY

Byline

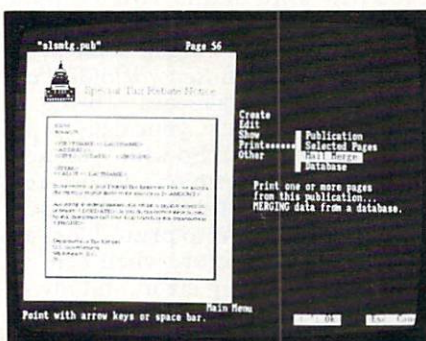
HARDWARE REQUIREMENTS: 384K IBM PC
PUBLISHER: Ashton-Tate Corp.
PRICE: \$295

Most desktop-publishing programs work with a mouse. *Byline* is different. Using the keyboard alone, you build a document by combining various text and graphics files that were created originally with other software. If you have ever put together a newsletter or an advertisement, you know the procedure. You print out and assemble the various parts, usually by pasting them to another piece of paper, which are then copied and printed or duplicated in some manner.

With *Byline*, you perform pasteup with a computer. The program creates a file that defines your publication: Each page has a spec sheet, along with spec sheets for its individual text and graphics elements.

When you begin, you are presented with a page spec screen, which shows a proportional image of the page and a list of parameters to be filled in, such as left and right margins. Here's where you can put a larger margin on the side that will be bound or hole punched. How do you know which is the inner side? Don't worry, the program has formats for both sides: If the proportional page image appears on the left side of the screen, then the inner margin is on the right, and vice versa.

Text is usually created with your word processor, but, if necessary, you can use *Byline*'s editor to change portions of text. However, be aware that you are actually working with the original file on disk, and any changes you make will be made to that file. One atypical feature is *Byline*'s ability to read Lotus 1-2-3 and *Symphony* worksheets, as well as *dBase III Plus* (or compatible) database files.



Graphics may be created by such programs as *PC Paintbrush*, *PC Paintbrush Plus*, *Publisher's Paintbrush*, *Microsoft Windows Paint*, or *Macintosh MacPaint* (in IBM disk format). You can also insert any business chart or graphic in Lotus 1-2-3 or *Symphony* format. *Byline* automatically determines which program created the graphic and then imports it into your page.

Byline supports a large number of dot-matrix as well as laser printers, giving it extra utility. The documentation is complete and easy to understand and includes a tutorial to help get you up to speed quickly and a reference section to help as your confidence grows. If you need a "pasteup artist," I recommend this one.

—BROOKS H. HUNT

geoPublish

HARDWARE REQUIREMENTS: C 64/128
PUBLISHER: Berkeley Softworks
PRICE: \$70

I always thought that true desktop publishing was reserved for "business" computers, like IBM PCs or Macintoshes. But *geoPublish* lets you use your C 64 or C 128 to perform many of the tasks traditionally associated with laying out a document for publication.

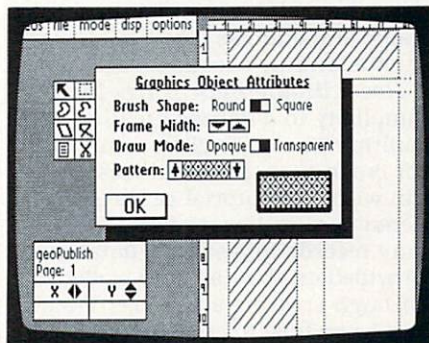
Designing a page is a three-step process. First you create "Master Pages" that are used to position items that will be repeated on all pages. They also include guidelines for placing text and graphics, along with headers and footers. You might include the name of your newsletter or the date of publication in a footer and the page number in a header. You can also insert graphics, such as a logo, and a line to separate your columns.

Then come steps two and three—

Page Layout and Page Graphics—for pasting up articles and graphics. You define rectangular regions, or sections, on a representation of your page and associate word-processing or graphics files with them. Once defined, these regions may be changed in size, moved, or overlapped.

If you need to change part of the article itself, there is a text editor. You use it to change wording, to shorten or lengthen the article, or to selectively emphasize portions of the text by changing fonts, type size, or style. Bit-mapped images created by *geoPaint* (included on the GEOS disk), and called *photoscrops*, can be imported and modified in several ways. You can also create fresh graphics with such included drawing tools as lines, circles, polygons, and open and closed splines (irregular curves) of varying widths and patterns.

However, some of the good features are imperfect. For instance, the program has zoom and preview modes that let you see what the final product will look like before printing. Yet, depending on your printer,



what you see on the screen may not exactly match what your printer produces. The program expects to print at a density of 80 dots per inch (dpi). Many printers work at 60 or 72 dpi instead, which results in part of the page not being printed and the rest distorted. The program includes sample Master Page and Layout libraries for 60 and 72 dpi to help you create your page if that's your situation, but the graphics will still be distorted. You can adjust, but selecting the proper ratio takes practice.

The GEOS people have brought to the C 64/128 many of the publishing capabilities that previously could only be had using larger computers. The manual includes background on

SOFTWARE REVIEWS

the nature of desktop publishing, a tutorial to help you quickly become acquainted with the program, a detailed description of each of the features, and several appendices, including shortcuts, tips on file management, and sample layout libraries. Only a thorough reading of the manual will reveal all of the features—but that's solely because there's so much here.

—BROOKS HUNT

RecordHolderPlus

HARDWARE REQUIREMENTS: 512K Macintosh

PUBLISHER: Software Discoveries, Inc.
PRICE: \$70

Back in the Neanderthal days of personal computing (also called the early eighties), I was a graduate student in library school taking my first information science class. I remember that the idea of setting up one's own database was instantly associated with nerds with ink-stained plastic pocket protectors. Now that I'm a card-carrying member of the computer cognoscenti, it's hard to believe that there was ever a time when I couldn't easily set up a name-and-address file or keep track of outstanding accounts receivable.

RecordHolderPlus brings further simplicity to database creation with multiple-choice English commands for creating records and files. To begin with, the tutorial in the manual demonstrates how to find and update records in a sample database provided on the disk and walks you through creating a new file. Then you learn how to change a display form and to design and print a report, which relies extensively on the Mac's graphic capabilities.

For purposes of evaluating *RecordHolderPlus*, I created a simplified library circulation database. With it, I can search any field for any item in the database—such as title or due dates—check books in and out, track and report overdue, and create mailing labels. I was impressed with how easy it was to implement most of the features. Creating data structures is made simple with built-in validation of data types. This means that text, dates, numbers, money, and other fields can be set up to test for both patterns and ranges. For example, you can set up fields—for names, perhaps—so that

each new word begins with a capital letter.

Users should beware of some peculiarities. Although *RecordHolderPlus* tells you that your record is being saved automatically, your data form is not being saved. So while you are building a data form or a report, remember to save often—particularly before you attempt to print. I lost an entire report structure when I encountered a system error, and my computer froze.

RecordHolderPlus is clearly best suited for the individual or small-business user. A salesperson might use it to keep track of contacts and key accounts, a teacher can get a statistical analysis of his or her students' grades, or a record maven might want to finally catalog those 6,000 12-inch black vinyls before they become obsolete. All this makes *RecordHolderPlus* a good choice for Mac owners who don't need a more expensive and complex relational database.

—KAREN J. NOVAK

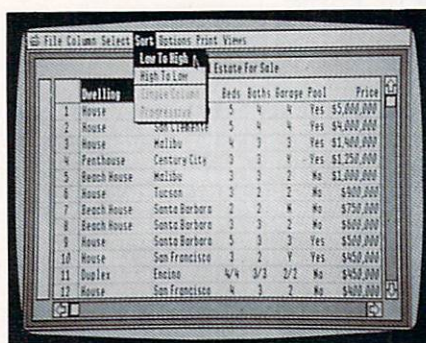
SoftWood GS File

HARDWARE REQUIREMENTS: Apple IIGS

PUBLISHER: SoftWood Company

PRICE: \$100

Organizing information is one of the most timesaving tasks a computer performs. I find it especially useful at tax time, and a database certainly



File	Column	Select	Sort	Options	Print	Views
1	House	High To Low	Low To High	High To Low	Low To High	High To Low
2	House	High To Low	Low To High	High To Low	Low To High	High To Low
3	House	High To Low	Low To High	High To Low	Low To High	High To Low
4	House	High To Low	Low To High	High To Low	Low To High	High To Low
5	House	High To Low	Low To High	High To Low	Low To High	High To Low
6	House	High To Low	Low To High	High To Low	Low To High	High To Low
7	House	High To Low	Low To High	High To Low	Low To High	High To Low
8	House	High To Low	Low To High	High To Low	Low To High	High To Low
9	House	High To Low	Low To High	High To Low	Low To High	High To Low
10	House	High To Low	Low To High	High To Low	Low To High	High To Low
11	House	High To Low	Low To High	High To Low	Low To High	High To Low
12	House	High To Low	Low To High	High To Low	Low To High	High To Low

beats my old method—a shopping bag full of receipts and paid bills in need of sorting. However, the process of setting up a file and entering data is often a dull experience at best.

SoftWood GS File showed me that using a database, although not in the same league as playing *King's Quest*, doesn't have to be tedious. Maybe it's the excitement of new software developed to take advantage

of the Apple IIGS's capabilities. Maybe it's the novelty of using a mouse with a Macintosh-like user interface. Or, maybe it's just that *GS File* is simply a well-designed program.

In the first step, defining your new file, you can choose predefined types of fields, such as amount, date, time, yes/no, and phone. These are further divided to allow you to choose from a variety of display formats. If you are not sure exactly what type of data will be entered throughout, selecting "Text" will ensure that all types of data can be entered. Fields can be easily redefined, if necessary, after data is entered.

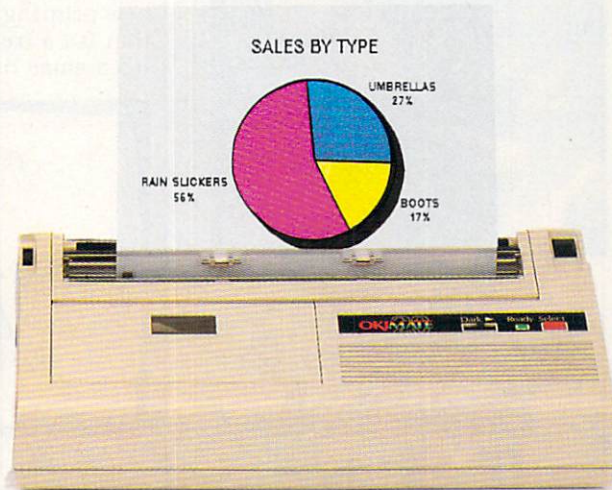
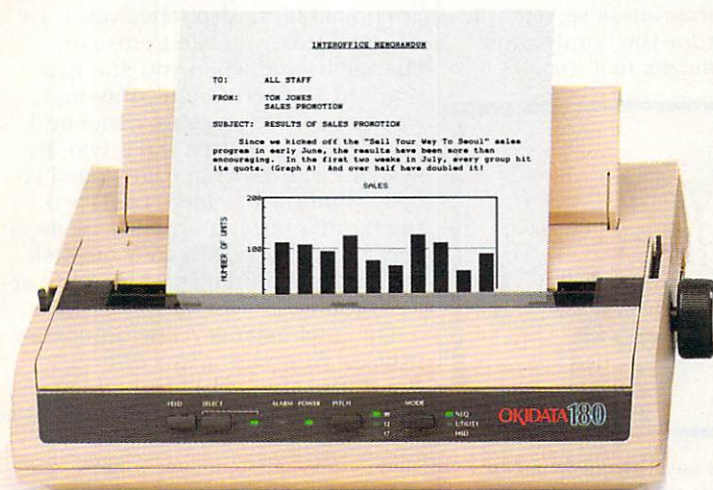
When reporting, *GS File* prints data fields only in the order they are initially arranged, so careful thought must be given to field order at the outset. A good example is setting up a file that might be used to generate mailing labels. Many people enter information with the LAST NAME as the first field. This would not be advisable here, for that is not how a mailing label should read.

AppleWorks database files can be read, a definite advantage to someone who has existing files and wishes to switch to *GS File*. The program can also read ASCII files. This type of feature is sometimes cumbersome; it has often frustrated me, so I especially looked to test it. I took a data file from an MS-DOS program and saved it as an ASCII file. Following the brief instructions given in the manual, I set up and defined the fields that would hold the incoming data, making sure they followed the same number, order, and field type. The two computers were then joined through a null modem cable, and using the appropriate communications software on each, the information was transferred. I was very impressed when everything worked with ease, a definite plus for *GS File*.

All in all, *GS File* is simple enough for the novice to use and packs enough features for the seasoned database user. The manual is clearly written, giving a general overview of the program, a tutorial in its use, and a reference guide. For home use, the program is all anyone should ever need. Businesses in search of a database should definitely consider its full features and ease of use. *GS File* is a program well done.

—JUDITH ZORNBERG

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CIRCLE READER SERVICE 45

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CIRCLE READER SERVICE 41

SOFTWARE REVIEWS

EDUCATION & CREATIVITY

SuperPrint

HARDWARE REQUIREMENTS: 128K Apple, IBM PC

PUBLISHER: Scholastic Software

PRICE: \$50

It's a tall order, but whatever it is, *SuperPrint* can handle it. From miniature designs to giant posters, this new printing program is so versatile that it's a treat for the family, and it's a small business tool, too.



If you like to say things in a big way, *SuperPrint* creates posters nearly five-feet tall and banners beyond belief. Advertise a giant sale. Or see how the children measure up: Print out a yardstick poster and hang it on the wall to track their height.

If you prefer understatement, select the miniature size and create a personalized notepad, party place cards, or gift enclosures.

Whatever your preference—from traditional greeting cards, signs, and banners to unique posters, border prints, and calendars—*SuperPrint* does it bigger and often better. I selected the poster option and now my office door at the school's computer lab sports a giant wizard who mixes up a potion. Computers, disks, and the words "Welcome to the realm of creative computing" emerge from his glass.

There are lots of well-done features in *SuperPrint*. You can see the big picture on-screen as you create it. Scroll through your design and decorate with a choice of more than 200 clip-art pictures—from celebrations and music to occupations or miscellaneous designs. You can use any number of graphics on the same page and vary the size and shape of the message. You can save parts of your design and try alternate ver-

sions or save the final product and print it in several sizes.

SuperPrint is so easy to use you don't even need the manual, but the thorough tutorials will help you get started, and the enticing activities offer hours of fun both on and off computer.

With all the positives, *SuperPrint* still has a few flawed attributes. Foremost, you can't create your own graphics or bring them in from other clip-art files. Also, once you leave a line of text, you can't erase or change it; and when you stamp a graphic, it's permanent. Having to swap the three program disks and my file disk too often (on a two-drive system) is annoying; color-coded labels could have helped. Last, printing banners in high-quality mode is very slow; it accesses your file disk frequently and makes you wait to select graphics.

The final balance? The unique aspects of *SuperPrint* well outweigh the things that could be better.

—GWEN SOLOMON

ENTERTAINMENT

Boulder Dash Construction Kit

HARDWARE REQUIREMENTS: 64K Apple, Atari, Atari ST, C 64/128, IBM PC

PUBLISHER: Epyx, Inc.

PRICE: \$25

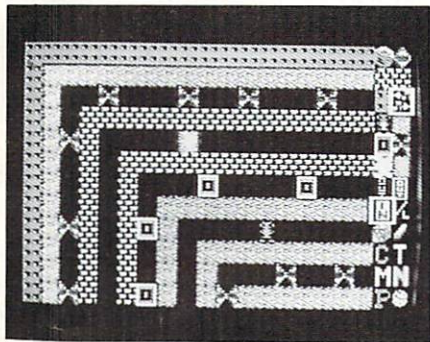
The Scene, A Software Store:

"Attention all miners! Attention all miners! A whole new cave with 15 brand new screens is here. It is replete with diamonds, boulders, slime, amoebas, butterflies, and other things. But wait . . . there's more. Also included is a construction kit that will let you conjure up countless caves of your own choosing."

For those of you unfamiliar with this popular game series—*Boulder Dash*, *Super Boulder Dash*, and now *Boulder Dash Construction Kit* (BDCK)—it's an arcade/strategy maze spectacular that stars Rockford the ant (an avid miner). As Rockford, you must grab up all the diamonds you can while avoiding falling boulders, explosive fireflies, growing walls, and related hazards. If no diamonds are present, Rockford must create them by dropping boulders on butterflies, suffocating amoebas (both of which turn into diamonds when they die), or pushing boulders through enchanted walls.

Boulder Dash requires not only a quick hand, but forethought and creativity as well.

The 15 cave screens provided are every bit as challenging as the ones in the first two games. In many ways they're better. Not only can you start on any screen, but there are three new features as well: slime, growing



walls, and hidden exits. Slime looks like an amoeba but doesn't grow or turn into diamonds. Instead, it lets boulders and diamonds pass through it at a variable rate. Growing walls have the same properties as normal walls except they expand into any clear, horizontally adjacent space. Hidden exits are indistinguishable from a normal wall and, so, are difficult to locate.

The construction kit, of course, is what makes this one more than just "*Boulder Dash III*." Using a system with a simplicity that belies its tremendous potential, *BDCK* often reminded me of *Lode Runner's* flawless construction set. With the combination of a large menu of objects and a gigantic game area, truly ingenious screens can be created with some experience. Features such as random object placement, line drawing (placing whole lines of objects at once), and the ability to play-test your creation at any time further augment *BDCK*.

Make sure you take a look at it. It's even a "boulder" and better game than its predecessors.

—DAVID LANGENDOEN

Go

HARDWARE REQUIREMENTS: 512K Macintosh

PUBLISHER: Infinity Software

PRICE: \$40

"A minute to learn, and a lifetime to master" is a phrase I often heard tossed around when I was an avid Go fan in high school. Those words

ring true. Go is a two-player strategy game invented in China some 4,000 years ago. The basic idea of the game revolves around trying to control the most territories on a board laid out in grid fashion. Black and white playing pieces, called stones, are placed on the intersections of the grid lines, one on each player's turn. If one player's stone gets surrounded with his opponent's stones—meaning that it has no adjoining horizontal or vertical spaces that are empty or of the same color—then that stone is captured, and a territory is claimed. Play consists of capturing your opponent's stones and/or setting up your pieces in such a way that, while you don't actually make any captures, you effectively control an area because it would be impossible for your opponent to place stones there without losing them right away.

Go for the Macintosh is a well-thought-out adaptation of this classic game. Playing against the computer (which clobbered me more than its fair share), another person, or even someone at the other end of a modem, you have a variety of options available so that you can tailor the game to meet your exact needs. First time? Then start out with more pieces on the board and have the computer explain the reasoning behind its moves. Old pro? You can control the computer's strategy and skill level, including the number of moves into the future the machine will look.

Go is as much a teaching tool as it is a game. You can learn from your mistakes by saving annotated games, then playing them over from different points, using different strategies. The two famous games that come on the disk are also good examples of play. However, I had a little difficulty figuring out how to use the on-line instruction manual, which is like a miniguide hypertext system.

Go is not copy-protected but comes with a little sheet of Go trivia from which you must answer a question each time you boot the program. The designer obviously cared enough about the game to make Go versatile, easy to use, and one of the best computer adaptations that I have seen. May you enjoy it as much as all the others who have played it for 40 centuries.

—JEFF DONAHUE



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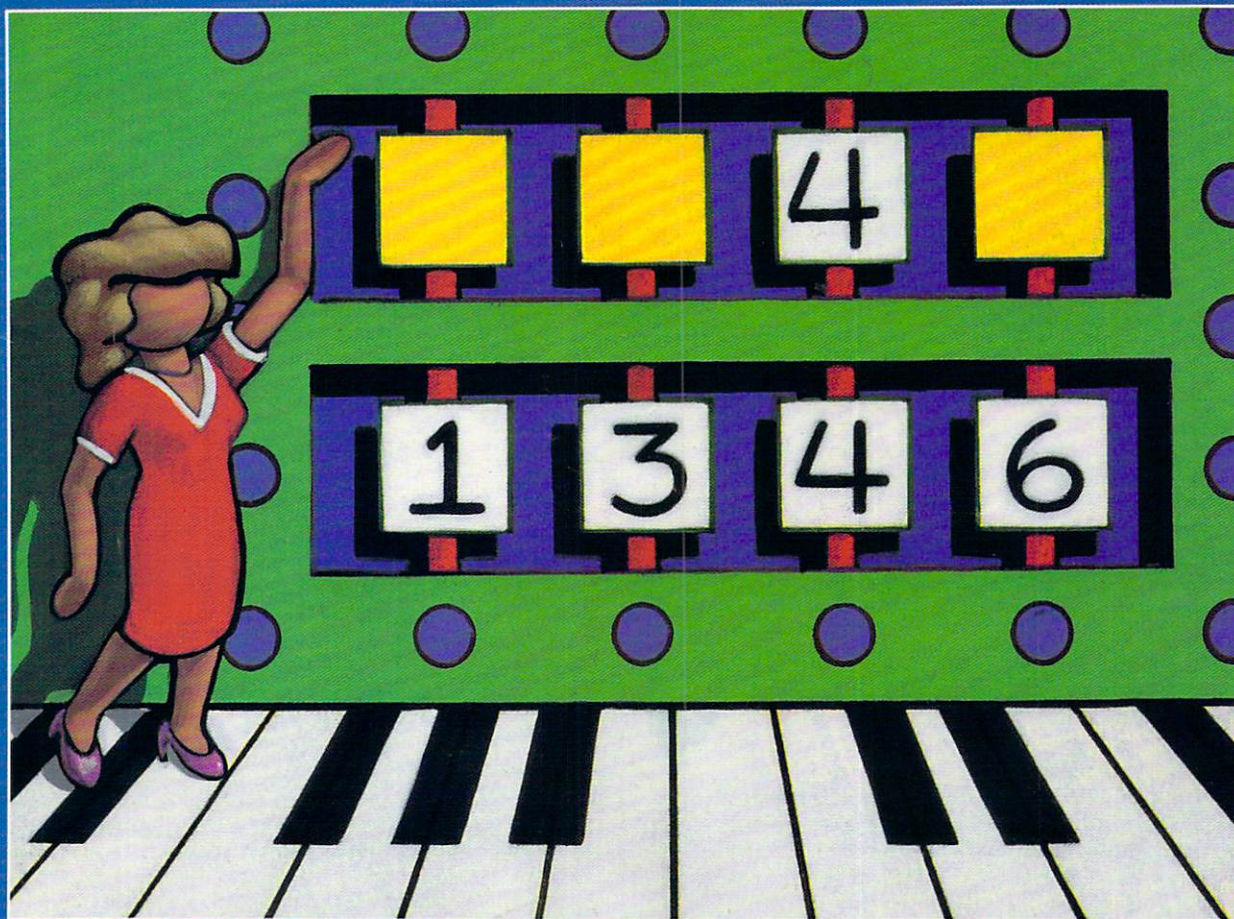
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THE PROGRAMMER



CONTENTS AND COVERAGE

FYI

Throughout *The Programmer*, you'll find news for programmers, information about our programs, and "Tips to the Typist."

GAME PROGRAM Page 78

Exercise your powers of deduction by trying to guess the *Hidden Digits*.

FUN WITH MUSIC Page 80

The *Melody Game* tests your tone recognition and memory as you try to mimic the tune your computer plays.

PUZZLE Page 86

You supply the words for our *Word Search* puzzle for the Commodore; then the program hides them in a grid of letters. You can solve the puzzle on-screen or make a printout.

MICROTONES Page 90

Flight of the Bumble Bee sounds like it stings, but it really just sings the "Flight of the Bumble Bee" by Rimsky-Korsakov.

Computers†	Hidden Digits	Word Search	Melody Game	Flight of the Bumble Bee
APPLE FAMILY				
APPLE II/PLUS/IIe/GS	★	SEPT '86	★	★
MACINTOSH	★		★	★
ATARI 800/XL/XE			★	★
COMMODORE 64/128	★	★ P	★ C	★
IBM PC FAMILY				
IBM PC	★	SEPT '86	★ C	★
IBM PCjr	★		★ C	★
IBM PS/2 MODEL 30	★		★ C	★
IBM PC COMPATIBLES				
BLUE CHIP	★		★	★
COMMODORE PC 10	★		★ C	★
EPSON EQUITY I	★		★ C	★
KAYPRO PC-10	★		★ C	★
LEADING EDGE MODEL D	★		★ C	★
PANASONIC FX-600	★		★ C	★
TANDY 1000 EX/HX/SX/TX	★		★ C	★
VENDEX HEADSTART TURBO 888-XT	★		★ C	★
ZENITH Z148PC	★		★ C	★
TANDY COLOR COMPUTER	★		★ C	★

KEY: ★ PROGRAM IN THIS ISSUE FOR THIS COMPUTER. + SEE PAGE 85 FOR SPECIFIC MODELS. C COLOR MONITOR RECOMMENDED. P PRINTER OPTIONAL.

HIDDEN DIGITS

BY STEVEN C. M. CHEN AND JEFF DONAHUE



Let's see . . . 4-3-2-6-5.
Nope . . . 4-3-2-6-9?
That's it! The master sleuth strikes again! If you like stretching your mind with brain games, then *Hidden Digits*, with its blend of strategy and luck, will throw your logic circuits into a frenzy.

You begin by choosing the number of digits (2 to 6) to be hidden. The more digits you hide, the harder it will be to uncover them. Not only do you have to figure out what the numbers are, you also have to get them in the right order.

The computer will then randomly generate a number sequence. Each position can be filled by any digit, 0 through 9, but no digit can appear more than once. On-screen, all you will see is

a line of Xs. At the GUESS: prompt, enter your first guess and press RETURN or ENTER. This first attempt will be a complete shot in the dark, but for each one of your guesses, the computer will give you two valuable clues: how many numbers of the sequence you have correct, and how many are in the right position. Depending upon your computer, up to 14 of your past guesses (and the computer's responses) will remain on the screen. By examining these and using your powers of deduction, you should be able to figure out the correct pattern.

Play the game with your friends and see who can uncover the hidden digits in the fewest guesses. Happy hunting!

Apple II series/Hidden Digits

```
10 DIM DP(9),RD$(15)
20 GS = CHR$(7):SP$ = CHR$(32):X$ = "X":BL$ = SP$
30 FOR L = 2 TO 20:BL$ = BL$+SP$:NEXT L:GOSUB 1000
40 PRINT "HOW MANY DIGITS WOULD YOU LIKE TO"
50 PRINT "HIDE (2=EASY; 6=DIFFICULT)? ";
60 GET K$:DL = VAL(K$)
70 IF DL < 2 OR DL > 6 THEN PRINT GS$:GOTO 60
80 X$$ = "X":FOR L = 2 TO DL:X$$ = X$$+"X":NEXT L
90 GOSUB 2000:CS = "":FOR L = 1 TO DL
100 T = INT(RND(1)*10):IF DP(T) THEN 100
110 DP(T) = 1:CS = CS+STR$(T):NEXT L
120 MAX = 1:TC = 0:GOSUB 1000
130 PRINT TAB(12+DL);"# OF";SPC(5);"CORRECT"
140 PRINT TAB(11+DL);"MATCHES";SPC(2);"POSITIONS"
150 GOSUB 2000:CX = 1
160 VTAB 23:PRINT "# OF GUESSES: ";TC:AS = X$$
170 VTAB MAX+4:HTAB 1:PRINT "GUESS: ";SP$:AS
180 TS = MID$(AS,CX,1):VTAB MAX+4:HTAB CX+7:PRINT TS
190 VTAB MAX+4:HTAB CX+7
200 GET K$:K = ASC(K$):DK = (K = 8)-(K = 21)
```

```
210 IF DK = 0 THEN 240
220 CX = CX+DK
230 CX = CX+((CX = 0)-(CX = DL+1))*DL:GOTO 180
240 IF K = 13 THEN 320
250 K = K-48:IF K < 0 OR K > 9 THEN PRINT GS$:GOTO 190
260 IF DP(K) THEN PRINT GS$:GOTO 190
270 IF TS <> "X" THEN DP(ASC(TS)-48) = 0
280 DP(K) = 1:VTAB MAX+4:HTAB CX+7:PRINT KS
290 IF CX = 1 THEN AS = KS+MID$(AS,2):GOTO 310
300 AS = LEFT$(AS,CX-1)+KS+MID$(AS,CX+1)
310 CX = CX+1-(CX = DL)*DL:GOTO 180
320 SF = 0:FOR L = 1 TO DL
330 IF MID$(AS,L,1) = X$ THEN SF = 1:L = DL
340 NEXT L:IF SF THEN PRINT GS$:GOTO 180
350 C = 0:P = 0:FOR L = 1 TO DL
360 C = C+DP(ASC(MID$(CS,L,1))-48)
370 IF MID$(CS,L,1) = MID$(AS,L,1) THEN P = P+1
380 NEXT L
390 RD$(MAX) = LEFT$(BL$,7)+AS+LEFT$(BL$,7)+STR$(C)+LE
FT$(BL$,9)+STR$(P)
400 VTAB MAX+4:HTAB 1:PRINT RD$(MAX)
410 TC = TC+1:IF C = DL AND P = DL THEN 460
420 IF MAX < 15 THEN MAX = MAX+1:GOTO 150
430 FOR L = 1 TO 14:RD$(L) = RD$(L+1):NEXT L
440 FOR L = 1 TO MAX-1:VTAB L+4:HTAB 1
450 PRINT RD$(L):NEXT L:GOTO 150
460 VTAB 23:HTAB 1:PRINT BL$:VTAB MAX+6
470 PRINT "CONGRATULATIONS; YOU BROKE THE CODE IN"
480 PRINT TC;" GUESSES." :END
1000 HOME:HTAB 13:INVERSE:PRINT "HIDDEN DIGITS"
1010 NORMAL:PRINT:RETURN
2000 FOR L = 0 TO 9:DP(L) = 0:NEXT L:RETURN
```

Commodore 64 & 128 (C 64 mode)/Hidden Digits

```
10 DIM DP(9),RD$(15):S=54273
20 FOR L=S TO S+24:POKE L,0:NEXT L
30 POKE 53280,12:POKE 53281,12
40 SP$=CHR$(32):BL$=SP$:FOR L=2 TO 20
50 BL$=BL$+SP$:NEXT L:GOSUB 1000
60 PRINT "HOW MANY DIGITS WOULD YOU LIKE TO"
70 PRINT "HIDE (2=EASY; 6=DIFFICULT)? "
80 GET K$:IF K$="" THEN 80
90 DL=VAL(K$):IF DL<2 OR DL>6 THEN GOSUB 2000:GOTO 80
100 X$$="X":FOR L=2 TO DL:X$$=X$$+"X":NEXT L
110 D$$="0123456789":T$=D$:C$="":FOR L=1 TO DL
120 T=INT(RND(1)*LEN(T$)+1):C$=C$+MID$(T$,T,1)
130 T$=LEFT$(T$,T-1)+MID$(T$,T+1)
140 NEXT L:MAX=1:TC=0:GOSUB 1000
150 PRINT TAB(11+DL);"# OF";SPC(5);"CORRECT"
160 PRINT TAB(10+DL);"MATCHES";SPC(2);"POSITIONS"
170 T$=D$:FOR L=0 TO 9:DP(L)=0:NEXT L:CX=1
180 POKE 646,1:POKE 214,22:PRINT
190 PRINT "# OF GUESSES: ";TC;AS=X$$
200 POKE 214,MAX+3:PRINT:PRINT "GUESS: ";
210 POKE 646,0:PRINT SP$:AS;BL$:LEFT$(BL$,7)
220 TS=MID$(AS,CX,1)
230 POKE 214,MAX+3:PRINT:PRINT TAB(6+CX);SP$
240 POKE 214,MAX+3:PRINT:PRINT TAB(6+CX);TS
250 GET K$:IF K$="" THEN 230
260 K=ASC(K$):DK=(K=15)-(K=29):IF DK=0 THEN 290
270 CX=CX+DK
280 CX=CX+((CX=DL+1)-(CX=0))*DL:GOTO 220
290 IF K=13 THEN 370
300 K=K-48:IF K<0 OR K>9 THEN GOSUB 2000:GOTO 240
310 IF DP(K) THEN GOSUB 2000:GOTO 240
320 IF TS<>"X" THEN DP(ASC(TS)-48)=0
330 DP(K)=1:POKE 214,MAX+3:PRINT:PRINT TAB(6+CX);KS
340 IF CX=1 THEN AS=KS+MID$(AS,2):GOTO 360
350 AS=LEFT$(AS,CX-1)+KS+MID$(AS,CX+1)
360 CX=CX+1+(CX=DL)*DL:GOTO 220
370 SF=0:FOR L=1 TO DL
380 IF MID$(AS,L,1)="X" THEN SF=1:L=DL
390 NEXT L:IF SF THEN GOSUB 2000:GOTO 230
```



```

400 C=0:P=0:FOR L=1 TO DL
410 C=C+DP(ASC(MID$(C$,L,1))-48)
420 IF MID$(C$,L,1)=MID$(A$,L,1) THEN P=P+1
430 NEXT L
440 RD$(MAX)=LEFT$(BL$,7)+A$+LEFT$(BL$,5)+STR$(C)+LEFT
$(BL$,8)+STR$(P)
450 POKE 214,MAX+3:PRINT:PRINT RD$(MAX)
460 TC=TC+1:IF C=DL AND P=DL THEN 510
470 IF MAX<15 THEN MAX=MAX+1:GOTO 170
480 FOR L=1 TO 14:RD$(L)=RD$(L+1):NEXT L
490 FOR L=1 TO MAX-1:POKE 214,L+3:PRINT:PRINT RD$(L)
500 NEXT L:GOTO 170
510 POKE 214,22:PRINT:PRINT BL$:POKE 214,MAX+4:PRINT
520 PRINT "CONGRATULATIONS, YOU FIGURED OUT THE"
530 PRINT "NUMBERS IN";TC;"GUESSES":END
1000 POKE 646,6
1010 PRINT CHR$(147);TAB(12);"HIDDEN DIGITS"
1020 POKE 646,1:PRINT:PRINT:RETURN
2000 POKE 5,60:POKE 5,240:POKE 5,23,5
2010 POKE 5,3,17:FOR D=1 TO 100:NEXT D
2020 POKE 5,23,0:POKE 5,0:RETURN

```

IBM PC & compatibles/Hidden Digits

```

10 DIM RD$(15):RANDOMIZE TIMER:KEY OFF:LOCATE ,,0
20 SP$=CHR$(32):X$="X":GOSUB 1000
30 PRINT "How many digits would you like to"
40 PRINT "hide (2=easy; 6=difficult)?"
50 K$=INKEY$:IF K$="" THEN 50
60 DL=VAL(K$):IF DL<2 OR DL>6 THEN BEEP:GOTO 50
70 DSS="0123456789":TD$=DSS:C$="":FOR L=1 TO DL
80 T=INT(RND*LEN(TD$))+1:C$=C$+MID$(TD$,T,1)
90 TD$=LEFT$(TD$,T-1)+MID$(TD$,T+1)
100 NEXT L:MAX=1:TC=0:GOSUB 1000
110 PRINT TAB(12+DL);"# OF";SPC(5);"CORRECT"
120 PRINT TAB(11+DL);"MATCHES";SPC(2);"POSITIONS"
130 TD$=DSS:CX=1:LOCATE 21,1
140 PRINT "# of guesses:";TC;A$=STRING$(DL,X$)
150 LOCATE MAX+4,1:PRINT "GUESS:";SP$;A$
160 TAS=MID$(A$,CX,1)
170 LOCATE MAX+4,CX+7:PRINT CHR$(219)
180 LOCATE MAX+4,CX+7:PRINT MID$(A$,CX,1)
190 K$=INKEY$:IF K$="" THEN 170
200 IF LEN(K$)=2 THEN 270
210 IF K$=CHR$(13) THEN 310
220 KC=INSTR(TD$,K$):IF KC=0 THEN BEEP:GOTO 170
230 TD$=LEFT$(TD$,KC-1)+MID$(TD$,KC+1)
240 IF TAS<>X$ THEN TD$=TD$+TAS
250 LOCATE MAX+4,CX+7:PRINT K$:MID$(A$,CX,1)=K$
260 CX=CX+1+(CX=DL)*DL:GOTO 160
270 DK=INSTR("KM",MID$(K$,2))
280 IF DK=0 THEN BEEP:GOTO 170
290 CX=CX+(DK=1)-(DK=2)
300 CX=CX+((CX=DL+1)-(CX=0))*DL:GOTO 160
310 IF INSTR(A$,X$)<>0 THEN BEEP:GOTO 170
320 C=0:P=0:FOR L=1 TO DL:TS=MID$(A$,L,1)
330 C=C-(INSTR(C$,TS)<>0)
340 IF MID$(C$,L,1)=TS THEN P=P+1
350 NEXT L
360 RD$(MAX)=SPACES(7)+A$+SPACES(6)+STR$(C)+SPACES(8)+
STR$(P)
370 LOCATE MAX+4,1:PRINT RD$(MAX)
380 TC=TC+1:IF C=DL AND P=DL THEN 430
390 IF MAX<15 THEN MAX=MAX+1:GOTO 130
400 FOR L=1 TO 14:RD$(L)=RD$(L+1):NEXT L
410 LOCATE 5,1:FOR L=1 TO MAX-1:PRINT RD$(L)
420 NEXT L:GOTO 130
430 LOCATE 23,1:PRINT SPACES(17):LOCATE MAX+6,1
440 PRINT "Congratulations; you figured out the number
s in ";TC;"guesses."
450 PRINT:KEY ON:END
1000 CLS:COLOR 14:PRINT TAB(10);"HIDDEN DIGITS"
1010 COLOR 2:PRINT:RETURN

```

Macintosh/Hidden Digits

```

10 DIM RD$(15):RANDOMIZE TIMER
20 WINDOW 1,"HIDDEN DIGITS",0,38)-(527,338)
30 CALL TEXTFONT(4):CALL TEXTSIZE(9):CALL TEXTMODE(0)
40 CALL HIDECURSOR:SP$=CHR$(32):X$="X":CLS:PRINT
50 PRINT "How many digits would you like to"
60 PRINT "hide (2=easy; 6=difficult)?"
70 K$=INKEY$:IF K$="" THEN 70
80 DL=VAL(K$):IF DL<2 OR DL>6 THEN BEEP:GOTO 70
90 DSS="0123456789":TD$=DSS:C$="":FOR L=1 TO DL
100 T=INT(RND*LEN(TD$))+1:C$=C$+MID$(TD$,T,1)
110 TD$=LEFT$(TD$,T-1)+MID$(TD$,T+1)
120 NEXT L:MAX=1:TC=0:CLS:PRINT
130 PRINT TAB(12+DL);"# OF";SPC(5);"CORRECT"
140 PRINT TAB(11+DL);"MATCHES";SPC(2);"POSITIONS"
150 LOCATE 23,1:PRINT "<OPTION>+<N>=Cursor Left"
160 PRINT "<OPTION>+<M>=Cursor Right"
170 TD$=DSS:CX=1:LOCATE 21,1
180 PRINT "# of guesses:";TC;A$=STRING$(DL,X$)
190 LOCATE MAX+4,1:PRINT "GUESS:";SP$;A$
200 TAS=MID$(A$,CX,1)
210 CALL TEXTMODE(2):LOCATE MAX+4,CX+7:PRINT CHR$(219)
220 LOCATE MAX+4,CX+7:PRINT TAS
230 CALL TEXTMODE(0):K$=INKEY$:IF K$="" THEN 210
240 DK=INSTR(CHR$(126)+CHR$(246)+CHR$(181)+CHR$(247),K
$)+1
250 IF DK>1 THEN DK=INT(DK/2):GOTO 320
260 IF K$=CHR$(13) THEN 340
270 KC=INSTR(TD$,K$):IF KC=0 THEN BEEP:GOTO 210
280 TD$=LEFT$(TD$,KC-1)+MID$(TD$,KC+1)
290 IF TAS<>X$ THEN TD$=TD$+TAS
300 LOCATE MAX+4,CX+7:PRINT K$:MID$(A$,CX,1)=K$
310 CX=CX+1+(CX=DL)*DL:GOTO 200
320 CX=CX+(DK=1)-(DK=2)
330 CX=CX+((CX=DL+1)-(CX=0))*DL:GOTO 200
340 IF INSTR(A$,X$)<>0 THEN BEEP:GOTO 210
350 C=0:P=0:FOR L=1 TO DL:TS=MID$(A$,L,1)
360 C=C-(INSTR(C$,TS)<>0)
370 IF MID$(C$,L,1)=TS THEN P=P+1
380 NEXT L
390 RD$(MAX)=SPACES(7)+A$+SPACES(6)+STR$(C)+SPACES(8)+
STR$(P)
400 LOCATE MAX+4,1:PRINT RD$(MAX)
410 TC=TC+1:IF C=DL AND P=DL THEN 460
420 IF MAX<15 THEN MAX=MAX+1:GOTO 170
430 FOR L=1 TO 14:RD$(L)=RD$(L+1):NEXT L
440 LOCATE 5,1:FOR L=1 TO MAX-1:PRINT RD$(L)
450 NEXT L:GOTO 170
460 LOCATE 21,1:FOR L=1 TO 4:PRINT SPACES(20):NEXT L
470 LOCATE MAX+6,1:PRINT "Congratulations; you figured
out the numbers in";TC;"guesses."
480 PRINT:PRINT "Press <SPACE BAR> to quit."
490 IF INKEY$<>CHR$(32) THEN 490 ELSE END

```

Tandy Color Computer/Hidden Digits

```

10 CLEAR 1000:DIM DP(9),RD$(10)
20 SP$=CHR$(32):X$="X":GOSUB 1000
30 PRINT "HOW MANY DIGITS WOULD YOU LIKE"
40 PRINT "TO HIDE (2=EASY; 6=HARD)?"
50 K$=INKEY$:IF K$="" THEN 50
60 DL=VAL(K$):IF DL<2 OR DL>6 THEN SOUND 50,6:GOTO 50
70 DSS="0123456789":TD$=DSS:C$="":FOR L=1 TO DL
80 T=RND(LEN(TD$)):C$=C$+MID$(TD$,T,1)
90 TD$=LEFT$(TD$,T-1)+MID$(TD$,T+1)
100 NEXT L:MAX=1:TC=0:GOSUB 1000
110 PRINT TAB(9+DL);"# OF";STRING$(5,32);"CORRECT"
120 PRINT TAB(8+DL);"MATCHES";STRING$(2,32);"POSITIONS"
130 TD$=DSS:GOSUB 2000:CX=1
140 PRINT@480,"# OF GUESSES:";TC;A$=STRING$(DL,X$)
150 PRINT@96+MAX*32,"GUESS:";SP$;A$
160 TS=MID$(A$,CX,1)

```


MELODY GAME

BY JOEY LATIMER

Here's a simple game that will give your musical memory a real workout. The computer plays a random melody, and your challenge is to repeat the melody exactly as you heard the computer play it.

There are three numbered boxes on the screen labeled 1, 2, and 3. Each box represents a musical note and flashes when that note is played. If you play the melody back correctly (using keys 1, 2, and 3), the computer will play it again, adding one note to the end.

As the number of notes in the melody increases, so does the challenge. A misplayed note, however, ends the round, and your

score is displayed. You earn one point each time you correctly replay the melody. For example, if you play the nine notes of the ninth melody correctly, but miss a note in the tenth round, you only earn nine points.

To make the *Melody Game* easier or harder, simply adjust the speed at which the computer plays the melody to one of the six levels indicated at either the beginning of the game or in the "S" menu option. Happy melody making!

EDITOR'S NOTE: For more fun, experienced programmers should try changing the notes associated with each block.

Apple II series/Melody Game

```
10 DIM LM(3),N(3),NUM(300):NORMAL
20 HS = 0:FOR L = 1 TO 3:READ LM(L),N(L):NEXT L
30 FOR L = 0 TO 36:READ A:POKE 768+L,A:NEXT L
40 GOSUB 1000
50 PRINT "PLEASE TYPE A NUMBER BETWEEN 1 AND 6 TO"
60 PRINT "SET THE SPEED FACTOR (1=FAST; 6=SLOW).";
70 GOSUB 2000:SF = VAL(K$)
80 IF SF < 1 OR SF > 6 THEN PRINT CHR$(7);:GOTO 70
90 GOSUB 1000
100 PRINT TAB(5);"LISTEN CAREFULLY TO THE MELODY."
110 PRINT TAB(5);"EARN POINTS BY PLAYING IT BACK"
120 PRINT TAB(5);"CORRECTLY, USING KEYS 1-3.:PRINT
130 PRINT TAB(5);"PRESS <B> TO BEGIN.":GOSUB 2000
140 IF K$ <> "B" THEN PRINT CHR$(7):GOTO 90
150 TT = 1:VTAB 7:HTAB 5:PRINT SPC(19)
160 INVERSE:FOR V = 1 TO 3:FOR L = 10 TO 14
170 VTAB L:HTAB LM(V)-1:PRINT SPC(5):NEXT L,V:NORMAL
180 VTAB 16:HTAB 13:PRINT "1";SPC(6);"2";SPC(6);"3"
190 FOR DE = 1 TO 200:NEXT DE:POKE -16368,0
200 NUM(TT) = INT(RND(1)*3)+1:FL = 1:FOR X = 1 TO TT
210 V = NUM(X):GOSUB 3000:NEXT X:FL = 0:X = 1
220 GOSUB 2000:V = VAL(K$)
230 IF V < 1 OR V > 3 THEN V = NUM(X):GOTO 280
240 GOSUB 3000:IF NUM(X) <> V THEN V = NUM(X):GOTO 280
250 IF X <> TT THEN X = X+1:POKE -16368,0:GOTO 220
260 TT = TT+(TT <> 300)
270 FOR DE = 1 TO 500:NEXT DE:GOTO 200
280 FOR DE = 1 TO 200:NEXT DE
290 FOR X = 200 TO 100 STEP -5:GOSUB 4000:GOSUB 3030
300 POKE 6,6:POKE 8,X:CALL 768:NEXT X:GOSUB 1000
310 PRINT "SORRY, YOU MISSED A NOTE IN THE MELODY."
320 PRINT:PRINT "YOUR SCORE: ";TT
330 IF TT > HS THEN HS = TT
340 PRINT:PRINT "HIGH SCORE: ";HS
350 PRINT:PRINT "PRESS <S> TO SET SPEED FACTOR,"
360 PRINT TAB(7);"<P> TO PLAY AGAIN, OR"
370 PRINT TAB(7);"<Q> TO QUIT.:"
380 GOSUB 2000:IF K$ = "Q" THEN HOME:END
390 IF K$ = "P" THEN 90
400 IF K$ = "S" THEN 40
410 GOTO 380
1000 HOME:PRINT TAB(12);"THE MELODY GAME":PRINT:RETURN
```

```
170 PRINT@102+MAX*32+CX,SP$;
180 PRINT@102+MAX*32+CX,TS;
190 K$=INKEY$:IF K$="" THEN 170
200 K=ASC(K$):DK=(K=8)-(K=9):IF DK=0 THEN 220
210 CX=CX+DK:CX=CX+((CX=DL+1)-(CX=0))*DL:GOTO 160
220 IF K=13 THEN 300
230 K=K-48:IF K<0 OR K>9 THEN SOUND 50,6:GOTO 170
240 IF DP(K) THEN SOUND 50,6:GOTO 170
250 IF TS<>"X" THEN DP(ASC(TS)-48)=0
260 DP(K)=-1:PRINT@102+MAX*32+CX,K$;
270 IF CX=1 THEN AS=K$+MID$(AS,2):GOTO 290
280 AS=LEFT$(AS,CX-1)+K$+MID$(AS,CX+1)
290 CX=CX+1+(CX=DL)*DL:GOTO 160
300 SF=0:FOR L=1 TO DL
310 IF MID$(AS,L,1)=X$ THEN SF=1:L=DL
320 NEXT L:IF SF THEN SOUND 50,6:GOTO 170
330 C=0:P=0:FOR L=1 TO DL
340 C=C-DP(ASC(MID$(C$,L,1))-48)
350 IF MID$(C$,L,1)=MID$(AS,L,1) THEN P=P+1
360 NEXT L
370 RD$(MAX)=STRING$(7,32)+AS+STRING$(3,32)+STR$(C)+STR$(8,32)+STR$(P)
380 PRINT@96+MAX*32,RD$(MAX)
390 TC=TC+1:IF C=DL AND P=DL THEN 440
400 IF MAX<10 THEN MAX=MAX+1:GOTO 130
410 FOR L=1 TO 9:RD$(L)=RD$(L+1):NEXT L
420 FOR L=1 TO MAX-1:PRINT@96+L*32,RD$(L)
430 NEXT L:GOTO 130
440 PRINT@480,STRING$(20,32);
450 PRINT@128+MAX*32,"CONGRATULATIONS; YOU FIGURED OUT";
460 PRINT "THE NUMBERS IN";TC;"GUESSES.":END
1000 CLS:PRINT TAB(10);"HIDDEN DIGITS"
1010 PRINT:RETURN
2000 FOR L=0 TO 9:DP(L)=0:NEXT L:RETURN
```

FYI

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COVERAGE NEWS

Beginning with the April 1988 issue of FAMILY & HOME-OFFICE COMPUTING, BASIC programs for the Atari 800/XL/XE and Tandy Color Computer will no longer be published.

REFERENCE GUIDE FOR IBM PROGRAMMERS

The Peter Norton Programmer's Guide to the IBM PC is a 448-page, softcover book filled with advice on programming any of the IBM 8088/80286 family of personal computers. The reference is an invaluable tool to understanding the mechanics of (and differences among) the various IBM PC machines. It includes a thorough discussion of disks, monitors, keyboards, DOS functions, sound generation, and more. The book is available for \$19.95 from Microsoft Press, 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073.

HOME-OFFICE DEDUCTION UPDATE

The Internal Revenue Service (IRS) has published a revision to Publication 587 (*Business Use of Your Home*). That publication now contains a worksheet that differs from the one we published in the February issue in two ways. First, the IRS uses the old definition of gross income—that is, gross receipts—and deducts expenses such as advertising and supplies later. Second, the IRS treats mortgage interest and real-estate taxes slightly differently. These changes affect only taxpayers whose business portion of mortgage interest and real-estate taxes combined exceed their gross income. See the April issue for more.


```

2000 K = PEEK(-16384)-128:IF K < 0 THEN 2000
2010 POKE -16384,0
2020 KS = CHR$(K-(K > 96)*(K < 123)*32):RETURN
3000 GOSUB 4000:POKE 6,SF*6
3010 IF FL THEN POKE 8,N(NUM(X)):CALL 768:GOTO 3030
3020 POKE 8,N(V):CALL 768
3030 INVERSE:GOSUB 4000:NORMAL:RETURN
4000 FOR L = 11 TO 13:VTAB L:HTAB LM(V)
4010 PRINT SPC(3):NEXT L:RETURN
5000 DATA 12,162,19,121,26,108
6000 DATA 165,8,201,2,176,2,169,2,74,133,10,164,8
6010 DATA 240,8,173,48,192,234,234,136,208,251,56
6020 DATA 165,7,229,10,133,7,176,235,198,6,208,231,96

```

Atari 800/XL/130 XE/Melody Game

```

10 DIM CH$(9),KS(1),CLS(19),TAB$(4)
20 DIM LM(3),N(3),NUM(300):OPEN #1,4,0,"K:":HS=0
30 POKE 82,0:POKE 752,1:POKE 710,0
40 FOR L=1 TO 3:READ A,B:LM(L)=A:N(L)=B:NEXT L
50 CL$=CHR$(32):CL$(19)=CL$:CL$(2)=CL$:TAB$=CL$(1,4)
60 CH$=CHR$(32):CH$(5)=CH$:CH$(2)=CH$
70 FOR L=4 TO 6:CH$(L,L)=CHR$(160):NEXT L
80 FOR L=7 TO 9:CH$(L,L)=CHR$(148):NEXT L
90 GOSUB 2000
100 PRINT "PLEASE TYPE A NUMBER BETWEEN 1 AND 6 TO"
110 PRINT "SET THE SPEED FACTOR (1=FAST; 6=SLOW)."

```

Commodore 64 & 128 (C 64 mode)/Melody Game

```

10 DIM LM(3),NH(3),NL(3),NUM(300)
20 HS=0:FOR L=1 TO 3:READ LM(L),NH(L),NL(L):NEXT L
30 S=54272:FOR X=0 TO 23:POKE S+X,0:NEXT X
40 POKE S+5,31:POKE S+6,119:POKE S+24,15
50 POKE 53281,0:POKE 53280,0
60 CL$=CHR$(32):FOR L=2 TO 19:CL$=CL$+CHR$(32):NEXT L
70 GR$=CHR$(153):RV$=CHR$(18):SP$=LEFT$(CL$,3)
80 GOSUB 1000
90 PRINT GR$;"PLEASE TYPE A NUMBER BETWEEN 1 AND 6 TO"
100 PRINT "SET THE SPEED FACTOR (1=FAST; 6=SLOW)."

```

IBM PC & compatibles/Melody Game

```

10 DIM C(3),LM(3),N(3),NUM(300)
20 SCREEN 0,0:KEY OFF:DEF SEG=&H40:BT=11
30 IF (PEEK(&H10) AND 48)=32 THEN WIDTH 40 ELSE BT=13
40 DEF SEG=RANDOMIZE TIMER:LOCATE ,0,COLOR ,0
50 HS=0:FOR L=1 TO 3:READ C(L),LM(L),N(L):NEXT L
60 GOSUB 1000
70 PRINT "Please type a number between 1 and 6 to"
80 PRINT "set the speed factor (1=fast; 6=slow)."
```


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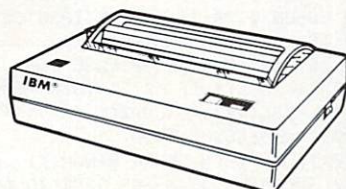
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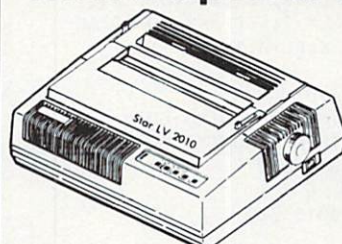
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FUN WITH MUSIC

```

90 GOSUB 2000:SF=VAL(K$)
100 IF SF<1 OR SF>6 THEN BEEP:GOTO 90
110 GOSUB 1000
120 PRINT TAB(5);"Listen carefully to the melody."
130 PRINT TAB(5);"Earn points by playing it back"
140 PRINT TAB(5);"correctly, using keys 1-3."
150 COLOR 12:PRINT:PRINT TAB(5);"Press <B> to begin."
160 GOSUB 2000:IF K$<>"B" THEN BEEP:GOTO 160
170 TOTAL=1:LOCATE 7,5:PRINT SPACES(19)
180 FOR V=1 TO 3:COLOR C(V):FOR L=BT-1 TO 14
190 LOCATE L,LM(V)-1:PRINT STRING$(5,219)
200 NEXT L,V:COLOR 2
210 LOCATE 16,13:PRINT "1";SPC(6);"2";SPC(6);"3"
220 NUM(TOTAL)=INT(RND*3)+1:FL=-1:FOR X=1 TO TOTAL
230 V=NUM(X):GOSUB 3000:NEXT X:FL=0:X=1
240 IF INKEY$<>" " THEN 240
250 K$=INKEY$:IF K$="" THEN 250
260 V=VAL(K$):IF V<1 OR V>3 THEN V=NUM(X):GOTO 310
270 GOSUB 3000:IF NUM(X)<>V THEN V=NUM(X):GOTO 310
280 IF X<>TOTAL THEN X=X+1:GOTO 250
290 TOTAL=TOTAL-(TOTAL<>3000)
300 FOR DE=1 TO 700:NEXT DE:GOTO 220
310 FOR DE=1 TO 400:NEXT DE
320 FOR X=200 TO 150 STEP -5:SOUND X,3
330 CH=219:COLOR INT(RND*10)+1:GOSUB 4000:NEXT X
340 TOTAL=TOTAL-1:GOSUB 1000:COLOR 12
350 PRINT "Sorry, you missed a note in the melody."
360 COLOR 2:PRINT:PRINT "Your score:";TOTAL
370 IF TOTAL>HS THEN HS=TOTAL
380 PRINT:PRINT "High score:";HS
390 PRINT:PRINT "Press <S> to set speed factor,"
400 PRINT TAB(7);"<P> to play again, or"
410 PRINT TAB(7);"<Q> to quit."
420 GOSUB 2000:IF K$="Q" THEN COLOR 7:CLS:KEY ON:END
430 IF K$="P" THEN 110
440 IF K$="S" THEN 60 ELSE 420
1000 CLS:COLOR 14:PRINT TAB(12);"The Melody Game"
1010 PRINT:COLOR 2:RETURN
2000 K$=INKEY$:IF K$="" THEN 2000
2010 K=ASC(K$):K$=CHR$(K-(K>96)*(K<123)*32):RETURN
3000 CH=32:GOSUB 4000
3010 IF FL THEN SOUND N(NUM(X)),SF/3 ELSE SOUND N(V),S
F/2
3020 SOUND 32767,.1:FOR DE=1 TO 20*SF:NEXT DE
3030 COLOR C(V):CH=219:GOSUB 4000:RETURN
4000 FOR L=BT TO 13:LOCATE L,LM(V)
4010 PRINT STRING$(3,CH):NEXT L:RETURN
5000 DATA 12,12,392,2,19,523.25,11,26,587.33

```

Macintosh/Melody Game

```

10 DIM LM(3),N(3),NUM(300):RANDOMIZE TIMER
20 WINDOW 1,"THE MELODY GAME", (0,38)-(527,338)
30 CALL TEXTFONT(4):CALL TEXTSIZE(9):CALL TEXTMODE(0)
40 HS=0:FOR L=1 TO 3:READ LM(L),N(L):NEXT L
50 CLS:PRINT
60 PRINT "Please type a number between 1 and 6 to"
70 PRINT "set the speed factor (1=fast; 6=slow)."
80 GOSUB 1000:SF=VAL(K$)
90 IF SF<1 OR SF>6 THEN BEEP:GOTO 80
100 DU=SF*2/3+.9:CLS:PRINT
110 PRINT TAB(27);"Listen carefully to the melody."
120 PRINT TAB(27);"Earn points by playing it back"
130 PRINT TAB(27);"correctly, using keys 1-3."
140 PRINT:PRINT TAB(27);"Press <B> to begin."
150 GOSUB 1000:IF K$<>"B" THEN BEEP:GOTO 150
160 TOTAL=1:LOCATE 6,27:PRINT SPACES(19)
170 FOR V=1 TO 3:GOSUB 2030:NEXT V
180 LOCATE 16,33:PRINT "1";SPC(8);"2";SPC(8);"3"
190 FOR DE=1 TO 400:NEXT DE
200 NUM(TOTAL)=INT(RND*3)+1:FL=-1:FOR X=1 TO TOTAL
210 V=NUM(X):GOSUB 2000:NEXT X:FL=0:X=1
220 IF INKEY$<>" " THEN 220
230 K$=INKEY$:IF K$="" THEN 230
240 V=VAL(K$):IF V<1 OR V>3 THEN V=NUM(X):GOTO 290
250 GOSUB 2000:IF NUM(X)<>V THEN V=NUM(X):GOTO 290

```

```

260 IF X<>TOTAL THEN X=X+1:GOTO 230
270 TOTAL=TOTAL-(TOTAL<>3000)
280 FOR DE=1 TO 1200:NEXT DE:GOTO 200
290 FOR DE=1 TO 400:NEXT DE
300 FOR X=250 TO 150 STEP -10:SOUND X,3
310 CH=30:GOSUB 3000:CH=33:GOSUB 3000:NEXT X
320 TOTAL=TOTAL-1:CLS
330 PRINT "Sorry, you missed a note in the melody."
340 PRINT:PRINT "Your score:";TOTAL
350 IF TOTAL>HS THEN HS=TOTAL
360 PRINT:PRINT "High score:";HS
370 PRINT:PRINT "Press <S> to set speed factor,"
380 PRINT TAB(7);"<P> to play again, or"
390 PRINT TAB(7);"<Q> to quit."
400 GOSUB 1000:IF K$="Q" THEN CLS:END
410 IF K$="P" THEN 100
420 IF K$="S" THEN 50 ELSE 400
1000 K$=INKEY$:IF K$="" THEN 1000
1010 K=ASC(K$):K$=CHR$(K-(K>96)*(K<123)*32):RETURN
2000 CH=30:GOSUB 3000
2010 IF FL THEN SOUND N(NUM(X)),DU ELSE SOUND N(V),DU
2020 SOUND 0,.3,0:FOR DE=1 TO 40*SF:NEXT DE
2030 CH=33:GOSUB 3000:RETURN
3000 LINE (LM(V),100)-(LM(V)+40,150),CH,BF:RETURN
4000 DATA 174,392,228,523,282,587

```

Tandy Color Computer/Melody Game

```

10 CLEAR 500:DIM C(3),LM(3),N(3),NUM(300)
20 HS=0:FOR L=1 TO 3:READ C(L),LM(L),N(L):NEXT L
30 GOSUB 1000
40 PRINT "PLEASE TYPE A NUMBER BETWEEN"
50 PRINT "1 AND 6 TO SET THE SPEED FACTOR"
60 PRINT TAB(8);"(1=FAST; 6=SLOW.)"
70 GOSUB 2000:SF=VAL(K$)
80 IF SF<1 OR SF>6 THEN SOUND 200,2:GOTO 70
90 GOSUB 1000
100 PRINT "LISTEN CAREFULLY TO THE MELODY."
110 PRINT "EARN POINTS BY PLAYING IT BACK"
120 PRINT "CORRECTLY, USING KEYS 1-3."
130 PRINT:PRINT TAB(5);"PRESS <B> TO BEGIN."
140 GOSUB 2000:IF K$<>"B" THEN SOUND 200,2:GOTO 140
150 TT=1:PRINT@196,STRING$(19,32)
160 FOR V=1 TO 3:GOSUB 3020:NEXT V
170 PRINT@361,"1";STRING$(5,32);"2";STRING$(5,32);"3"
180 NUM(TT)=RND(3):FL=-1:FOR X=1 TO TT
190 V=NUM(X):GOSUB 3000:NEXT X:FL=0:X=1
200 K$=INKEY$:IF K$="" THEN 200
210 V=VAL(K$):IF V<1 OR V>3 THEN V=NUM(X):GOTO 260
220 GOSUB 3000:IF NUM(X)<>V THEN V=NUM(X):GOTO 260
230 IF X<>TT THEN X=X+1:GOTO 200
240 TT=TT-(TT<>3000)
250 FOR DE=1 TO 600:NEXT DE:GOTO 180
260 FOR DE=1 TO 500:NEXT DE
270 FOR X=200 TO 150 STEP -5:SOUND X,3
280 CH=C(V):GOSUB 3030:NEXT X
290 TT=TT-1:GOSUB 1000
300 PRINT "SORRY, YOU MISSED A NOTE."
310 PRINT:PRINT "YOUR SCORE:";TT
320 IF TT>HS THEN HS=TT
330 PRINT:PRINT "HIGH SCORE:";HS
340 PRINT:PRINT "PRESS <S> TO SET SPEED FACTOR,"
350 PRINT TAB(6);"<P> TO PLAY AGAIN, OR"
360 PRINT TAB(6);"<Q> TO QUIT."
370 GOSUB 2000:IF K$="Q" THEN CLS:END
380 IF K$="P" THEN 90
390 IF K$="S" THEN 30 ELSE 370
1000 CLS:PRINT TAB(8);"THE MELODY GAME":PRINT:RETURN
2000 K$=INKEY$:IF K$="" THEN 2000
2010 K=ASC(K$):K$=CHR$(K-(K>96)*(K<123)*32):RETURN
3000 CH=32:GOSUB 3030
3010 IF FL THEN SOUND N(NUM(X)),SF ELSE SOUND N(V),SF
3020 CH=C(V):GOSUB 3030:RETURN
3030 FOR L=LM(V) TO LM(V)+32 STEP 32
4000 PRINT@L,STRING$(3,CH):NEXT L:RETURN
5000 DATA 159,264,147,175,270,176,255,276,185

```


THE SYSTEMS WE TEST ON

Every FAMILY & HOME-OFFICE COMPUTING program is thoroughly tested before publication. The exact systems we use during the testing process are listed here. While you can be sure that a program will work if your system matches ours, a comparable system configuration should also work. For example, even though we do not test on the Franklin Ace, Apple programs should work on this system. Any exception to the following hardware and software configurations will be listed in the chart on page 77. Systems that do not have specific printers listed were tested with Epson FX-80 printers when printer options were available.

Apple IIe in 40-column mode w/64K RAM, DOS 3.3, two disk drives, MPC parallel printer interface, monochrome and color monitors. Apple programs should also work on Apple IIc/II Plus and under ProDOS. **Apple IIcs** w/1MB RAM, one 3.5-inch and one 5.25-inch disk drive, ProDOS 3.3, and Apple RGB monitor. **Atari 800XL** w/two disk drives, DOS 2 version 2.05, Atari 850 interface, and color monitor. Atari programs should also work on Atari 800 (w/48K), 1200XL, and 65/130XE. Smaller programs should work on Atari 400 and 600XL. Programs will not work on the Atari XE Video Game System. **Commodore 128** in C 64 mode with two 1571 disk drives, color monitor, and Micrografix parallel graphics interface. Programs should also work on Commodore 64/64C/128D. **IBM PC** w/640K RAM, Disk BASIC D2.00, IBM Monochrome Display and Printer Adapter, monochrome monitor, IBM Color/Graphics Monitor Adapter, RGB monitor, AST Sixpack Plus, and IBM PC DOS 3.10. **IBM PCjr** w/128K RAM, one disk drive, IBM PC DOS 2.10, Cartridge BASIC J1.00. **IBM PS/2 Model 30** w/640K RAM, one floppy-disk and one hard-disk drive, RGB monitor, IBM PC DOS 3.30, and IBM PC BASIC A3.30. Programs should also work on the PS/2 Model 25. **Macintosh** w/512K RAM, two disk drives, Microsoft BASIC 2.1, and ImageWriter printer. Macintosh programs should also work on 128K Mac/Mac Plus/SE/II and under Microsoft BASIC 2.0.

Tandy Color Computer 2 w/64K RAM, Disk Extended Color BASIC 1.1, two disk drives, Botek serial-to-parallel printer interface, color monitor. Programs should also work on Color Computer 1 (w/64K) and 3.

The following PC compatibles have been added to our testing list. IBM PC programs should also work on other PC compatibles with at least 128K.

Blue Chip w/512K RAM, two disk drives, monochrome monitor, MS-DOS 3.20, GW-BASIC 3.20. **Commodore PC-10** w/640K RAM, two disk drives, monochrome monitor, MS-DOS 3.20, GW-BASIC 3.20. **Epson Equity I** w/256K RAM, two disk drives, monochrome display adapter, monochrome monitor, MS-DOS 3.10, GW-BASIC 3.10. Programs should also work on the Epson Equity I Plus, II, III, III Plus. **Kaypro PC 10** w/640K RAM, two disk drives, RGB monitor, MS-DOS 2.11, GW-BASIC 2.02. **Leading Edge Model D** w/640K RAM, two disk drives, monochrome and RGB monitors, MS-DOS 3.10, GW-BASIC 3.11. Programs should also run on the Leading Edge Model D2. **Panasonic FX-600** w/640K RAM, two disk drives, MS-DOS 3.10, Panasonic Personal Computer BASIC 3.11, enhanced graphics adapter, RGB monitor. **Tandy 1000 EX** w/256K RAM, two disk drives, MS-DOS 2.11 version 02.11.24, GW-BASIC 2.02 version 01.02.00, RGB monitor. **Tandy 1000 HX** w/256K RAM, one disk drive, MS-DOS 2.11 version 02.11.26, GW-BASIC 2.02 version 01.02.01, RGB monitor. **Tandy 1000 SX** w/384K RAM, two disk drives, MS-DOS 3.20 version 03.20.00, GW-BASIC 3.20 version 03.20.00, RGB monitor. **Tandy 1000 TX** w/640K RAM, one disk drive, MS-DOS 3.20 version 03.20.21, GW-BASIC 3.20 version 03.20.01, RGB monitor. IBM PCjr programs should also work on the Tandy 1000. If you have a Tandy 1400LT, 3000, or 4000, use the IBM PC and compatibles' version rather than the IBM PCjr and compatibles' version. **Vendex HeadStart Turbo 888-XT** w/640K RAM, two disk drives, MS-DOS 3.20, GW-BASIC 3.20, RGB monitor. **Zenith Z148PC** w/640K RAM, two disk drives, MS-DOS 3.10, GW-BASIC 3.20, RGB monitor.

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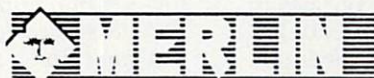
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WORD SEARCH

BY JOHN JAINSCHIGG



Since the Adam, Apple, and IBM versions of Word Search were published in the September 1986 issue, we've received many requests from Commodore owners asking for a translation. This month, we present the C 64 version.

Great for car trips and waiting rooms, working on word-search (or "find-a-word") puzzles is a good way to learn word-recognition skills and improve vocabulary. After all, if you can recognize a word spelled backward on the diagonal, you can recognize it anywhere.

The trouble with word-search puzzles in magazines and books is that they aren't guaranteed to contain the words you want, and creating your own puzzles from scratch is a drag. These problems are solved with Word Search, a program that helps you create word-search puzzles for friends and family to solve on the computer screen or print out for fun to go!

YOU SUPPLY THE WORDS

Using Word Search, you can create puzzles in three sizes: small (10 by 10 characters), medium (20 by 15 characters), and large (37 by 15 characters).

Once you've chosen a size, you'll be asked if you want to see the puzzle on the screen as it's placed in by the program. An empty border will appear

on the screen, and you'll see each word as the program places it.

Whether or not you're watching the puzzle as it forms, the program will ask you to enter, one by one, the words you want to appear in your puzzle. Note that you may not enter words that are longer than the dimensions of your puzzle.

As each word is entered, Word Search will try to fit it into your puzzle. Wherever possible, it will try to overlap words, increasing the puzzle's density and difficulty and making it possible to enter more words than could fit otherwise.

Word Search isn't perfect, of course, and occasionally it won't be able to fit in a word. When this happens, the program will do one of two things. If you've elected to watch the puzzle being formed, Word Search will ask you to specify a place for the word with which it's having trouble. Do so by moving the cursor (using the cursor keys) to where you want the word to begin in the grid. Press RETURN, and then move the cursor to the word's ending position and press RETURN once again. If you can't find a place, abandon the word by pressing the "A" key, and go on. If, on the other hand, you've chosen not to watch and participate in the formation of the puzzle, Word Search will automatically abandon any word for which it

can't find a place.

As the puzzle fills up, Word Search will eventually start having more and more trouble fitting in words. It will, however, keep trying new words until you tell it to quit. Do so by pressing RETURN at the WHAT IS YOUR WORD? prompt.

SOLVE YOUR PUZZLE

When your puzzle is finished, Word Search will ask you whether you want to solve the puzzle on the screen or print it out along with a word list. Additional options permit you to print out a

word list for reference, abandon the puzzle and try again, or quit.

To solve a puzzle on the screen, move the cursor to the beginning of a word, press RETURN, move to the end of the word, and press RETURN once again. Word Search will even highlight the word you've found and tell you how many words you have left. You can quit and return to the options menu at any time by pressing the "<" key located at the top, left-hand corner of your keyboard.

—C 64 TRANSLATION
BY STEVEN C.M. CHEN

Commodore 64 & 128 (C 64 mode, printer optional)/Word Search

```
10 DIM DR(7,2),DM(3,2),CUS(26),MS(6)
20 POKE 649,10:POKE 650,0:POKE 53280,12:POKE 53281,12
30 FOR Z=0 TO 7:READ DR(Z,1),DR(Z,2):NEXT Z
40 FOR Z=1 TO 3:READ DM(Z,1),DM(Z,2):NEXT Z
50 FOR Z=1 TO 26:CUS(Z)="" :NEXT Z:WHS=CHRS(5)
60 FOR Z=49 TO 54:MS(Z-48)=""<+CHRS(Z)+"" :NEXT Z
70 GOSUB 2000:PRINT "<1> SMALL (10 X 10)"
80 PRINT "<2> MEDIUM (20 X 15)"
90 PRINT "<3> LARGE (37 X 15)":PRINT
100 PRINT "WHICH SIZE PUZZLE DO YOU WANT TO CREATE?"
110 GOSUB 2100:K=ASC(K$)-48:IF K<1 OR K>3 THEN 110
120 GX=DM(K,1):GY=DM(K,2):WL=GX*GY
130 DIM PS(GX,GY),WS(WL):ES=CHRS(95):SPS=CHRS(32)
140 RV$=CHRS(18):BKS=RV$+SPS+CHRS(146)
150 Z$=SPS:FOR Z=2 TO 39:Z$=Z$+SPS:NEXT Z
160 RES=CHRS(13):BLS=RV$+CHRS(31)
170 LM=19-INT(GX/2):NW=0:GOSUB 2000
180 PRINT "WOULD YOU LIKE TO SEE THE PUZZLE AS IT'S BEING BUILT?":GOSUB 2200
190 SP=(K$="Y"):GOSUB 2000:IF SP THEN GOSUB 2300
200 POKE 214,19:PRINT:WD$=""
210 INPUT "WHAT IS YOUR WORD":WD$
220 T=LEN(WD$):GOSUB 2500
230 IF PEEK(1049)=42 THEN 250
240 GOSUB 2000:IF SP THEN GOSUB 2400
250 IF T=0 THEN ON -(NW>0) GOTO 800:GOTO 200
260 IF T<GX THEN 290
270 POKE 214,20:PRINT
280 PRINT "THAT WORD IS TOO LONG TO FIT.":GOTO 350
290 NW$="" :EF=0:FOR Z=1 TO T:K=ASC(MID$(WD$,Z,1))
300 IF K<65 OR (K>90 AND K<97) OR K>122 THEN EF=-1:Z=Z+1:GOTO 320
310 NW$=NW$+CHRS(K+32*(K>96))
320 NEXT Z:IF NOT EF THEN 360
330 POKE 214,20:PRINT:PRINT "THAT WORD"
340 PRINT "CONTAINS NONALPHABETIC CHARACTERS."
350 GOSUB 2600:GOSUB 2700:GOTO 200
360 IF NW=0 THEN 390
370 JF=0:FOR Z=1 TO NW:IF NW$=WS(Z) THEN JF=-1:Z=NW
380 NEXT Z:IF JF THEN 200
390 MC=0:FL=0:FOR P=1 TO LEN(NW$)
400 CL=ASC(MID$(NW$,P,1))-64:IF CUS(CL)="" THEN 510
410 FOR CO=1 TO LEN(CUS(CL)) STEP 2
420 CX=ASC(MID$(CUS(CL),CO,1))
430 CY=ASC(MID$(CUS(CL),CO+1,1))
440 FOR D=0 TO 7:CD=D+4-INT((D+4)/8)*8
450 BX=CX+DR(CD,1)*(P-1):BY=CY+DR(CD,2)*(P-1)
460 X=BX:Y=BY:GOSUB 3300
```


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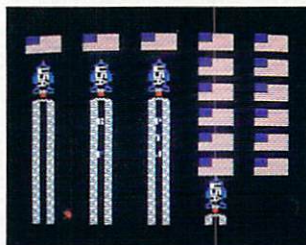
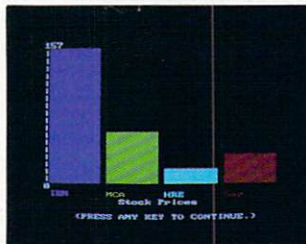
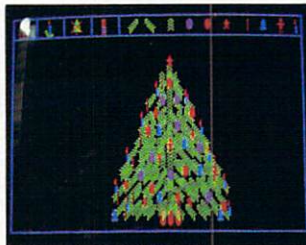
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PUZZLE

```

470 IF NOT FT THEN 500
480 FL=-1:IF NC<=MC THEN 500
490 MC=NC:WX=BX:WY=BY:WD=D
500 NEXT D,CO
510 NEXT P
520 IF FL THEN X=WX:Y=WY:D=WD:GOTO 690
530 FOR T=1 TO 100:D=INT(RND(1)*8)
540 BX=RND(1)*(GX-1)+1:BY=RND(1)*(GY-1)+1
550 X=BX:Y=BY:GOSUB 3300:IF FT THEN T=100
560 NEXT T:IF FT THEN X=BX:Y=BY:GOTO 690
570 GOSUB 2500:POKE 214,20:PRINT
580 PRINT "I CAN'T SEEM TO FIT"
590 PRINT NWS;". "
600 IF NOT SP THEN GOSUB 2600:GOSUB 2700:GOTO 200
610 PRINT "WOULD YOU CARE TO TRY?"
620 GOSUB 2200:GOSUB 2700:IF KS="N" THEN 200
630 PX=1:PY=1:GOSUB 4000:GOSUB 2700:IF EF THEN 200
640 X=BX:Y=BY:GOSUB 3310
650 IF FT THEN X=BX:Y=BY:GOTO 700
660 GOSUB 2500:POKE 214,20:PRINT
670 PRINT "SORRY, BUT THAT DOESN'T FIT."
680 GOSUB 2800:ON -(KS="A") GOTO 200:GOTO 630
690 VX=DR(D,1):VY=DR(D,2)
700 NW=NW+1:WS(NW)=NWS:FOR Z=1 TO LEN(NWS)
710 PS(X,Y)=MID$(NWS,Z,1):LP=ASC(PS(X,Y))-64
720 IF LEN(CUS(LP))=254 THEN CUS(LP)=RIGHT$(CUS(LP),25
2)
730 CUS(LP)=CUS(LP)+CHR$(X)+CHR$(Y)
740 IF SP THEN POKE 214,Y+1:PRINT:PRINT TAB(X+LM-1);PS
(X,Y)
750 X=X+VX:Y=Y+VY:NEXT Z
760 GOSUB 2500:IF NW<WL THEN 200
770 POKE 214,19:PRINT
780 PRINT "I DON'T HAVE SPACE FOR ANY MORE WORDS."
790 GOSUB 2600
800 FOR I=1 TO GX:FOR J=1 TO GY
810 IF PS(I,J)="" THEN PS(I,J)=CHR$(INT(RND(1)*26)+65)
820 NEXT J,I
830 QF=-1:WF=0:UW=NW:WP=1
840 GOSUB 2000:PRINT "WOULD YOU LIKE TO ..."
850 PRINT:PRINT:C=1:IF WF=0 THEN 890
860 PRINT M$(C);"CONTINUE PLAYING WHERE YOU LEFT OFF,"
870 C=C+1:PRINT M$(C);"PLAY AGAIN FROM THE BEGINNING,"
880 C=C+1:GOTO 900
890 PRINT M$(C);"PLAY YOUR PUZZLE ON-SCREEN,"C=C+1
900 PRINT M$(C);"PRINT PUZZLE OUT (WITH WORD LIST),"
910 C=C+1:PRINT M$(C);"PRINT OUT A WORD LIST,"
920 C=C+1:PRINT M$(C);"LEAVE THIS PUZZLE, OR"
930 C=C+1:PRINT M$(C);"QUIT?"
940 GOSUB 2100:S=ASC(K$)-48
950 IF S<1 OR S>5-(WF>0) THEN 940
960 GOSUB 2000:IF WF=0 THEN 990
970 IF S=2 THEN GOSUB 2900
980 S=-(S<>1)
990 ON S GOTO 1000,1330,1330,1420,1440
1000 GOSUB 2400:PX=1:PY=1
1010 POKE 214,18:PRINT
1020 PRINT "YOU HAVE YET TO FIND";STR$(UW);" WORD(S).
"
1030 GOSUB 3000:POKE 214,19:PRINT
1040 PRINT "WORD #":GOSUB 3100
1050 GOSUB 4000:IF EF THEN 1050
1060 IF MF THEN 840
1070 W$=""X=BX:Y=BY
1080 TS=PS(X,Y)
1090 IF LEN(T$)=3 THEN TS=MID$(T$,3)
1100 W$=W$+TS
1110 IF X<>EX OR Y<>EY THEN X=X+VX:Y=Y+VY:GOTO 1080
1120 Z=1
1130 IF LEFT$(W$(Z),1)=RE$ AND MID$(W$(Z),2)=W$ THEN
1190
1140 IF W$(Z)=W$ THEN 1220
1150 Z=Z+1:IF Z<=NW THEN 1130
1160 GOSUB 2700:POKE 214,20:PRINT
1170 PRINT "SORRY, BUT THAT WORD ISN'T IN THE LIST."
1180 GOTO 1210

```

```

1190 GOSUB 2700:POKE 214,20:PRINT
1200 PRINT "SORRY, YOU'VE ALREADY FOUND THAT WORD."
1210 GOSUB 2600:GOSUB 2700:GOSUB 3000:GOTO 1050
1220 W$(Z)=BL$+W$(Z):X=BX:Y=BY:PRINT BL$;
1230 TS=PS(X,Y)
1240 IF LEN(T$)=1 THEN PS(X,Y)=BL$+TS
1250 POKE 214,Y+1:PRINT:PRINT TAB(X+LM-1);PS(X,Y)
1260 IF X<>EX OR Y<>EY THEN X=X+VX:Y=Y+VY:GOTO 1230
1270 PRINT W$;:WF=WF+1:UW=NW-WF:IF UW>0 THEN 1010
1280 GOSUB 2900:POKE 214,18:PRINT:PRINT Z$:PRINT Z$
1290 GOSUB 2500:POKE 214,20:PRINT
1300 PRINT "CONGRATULATIONS!"
1310 PRINT "YOU'VE SOLVED THE PUZZLE."
1320 GOSUB 2600:GOTO 830
1330 PRINT "PRESS ANY KEY WHEN PRINTER IS READY."
1340 GOSUB 2100:OPEN 4,4:PRINT#4:IF S=3 THEN 1390
1350 FOR I=1 TO GY:FOR J=1 TO GX
1360 TS=PS(J,I):IF LEN(T$)=3 THEN TS=MID$(T$,3)
1370 PRINT#4,T$;SP$;:NEXT J:PRINT#4:NEXT I
1380 PRINT#4:PRINT#4
1390 FOR Z=1 TO NW:TS=W$(Z)
1400 IF LEFT$(TS,1)=RV$ THEN TS=MID$(TS,3)
1410 PRINT#4,T$:NEXT Z:PRINT#4:CLOSE 4:GOTO 840
1420 PRINT "ARE YOU SURE YOU WANT TO START AGAIN?"
1430 GOSUB 2200:ON -(KS="N") GOTO 840:RUN
1440 PRINT "ARE YOU SURE YOU WANT TO QUIT?"
1450 GOSUB 2200:IF KS="N" THEN 840
1460 PRINT CHR$(147):END
2000 PRINT CHR$(147);TAB(13);CHR$(28);"WORD SEARCH"
2010 PRINT W$:RETURN
2100 GET K$:ON -(K$="") GOTO 2100:RETURN
2200 GOSUB 2100:IF K$<>"Y" AND K$<>"N" THEN 2200
2210 RETURN
2300 PRINT CHR$(144);TAB(LM-1);RV$;LEFT$(Z$,GX+2)
2310 FOR Z=1 TO GY:PRINT TAB(LM-1);BK$;SPC(GX);BK$
2320 NEXT Z:PRINT TAB(LM-1);RV$;LEFT$(Z$,GX+2);W$
2330 RETURN
2400 GOSUB 2300:FOR I=1 TO GY
2410 POKE 214,I+1:PRINT:PRINT TAB(LM);
2420 FOR J=1 TO GX:TS=PS(J,I)
2430 IF TS="" THEN PRINT SP$;:GOTO 2460
2440 IF LEN(T$)=1 THEN PRINT TS;:GOTO 2460
2450 PRINT BL$;MID$(T$,3);W$;
2460 NEXT J,I:RETURN
2500 POKE 214,19:PRINT:FOR L=1 TO 4:PRINT Z$
2510 NEXT L:RETURN
2600 PRINT "PLEASE PRESS <RETURN> TO CONTINUE.";
2610 GOSUB 2100:ON -(K$<>RES) GOTO 2610:RETURN
2700 POKE 214,20:PRINT
2710 FOR L=1 TO 3:PRINT Z$:NEXT L:RETURN
2800 PRINT "<T>=TRY AGAIN <A>=ABANDON THIS WORD"
2810 GOSUB 2100:IF K$<>"A" AND K$<>"T" THEN 2810
2820 GOSUB 2700:RETURN
2900 FOR I=1 TO GX:FOR J=1 TO GY:TS=PS(I,J)
2910 IF LEN(T$)=3 THEN PS(I,J)=MID$(T$,3)
2920 NEXT J,I:FOR Z=1 TO NW
2930 IF LEFT$(W$(Z),1)=RV$ THEN W$(Z)=MID$(W$(Z),3)
2940 NEXT Z:WF=0:UW=NW:WP=1:RETURN
3000 POKE 214,20:PRINT:PRINT "<SPACE BAR>=ANOTHER WORD
<";E$;"=MENU.":RETURN
3100 POKE 214,19:PRINT
3110 PRINT TAB(6);MID$(STR$(WP),2);": ";
3120 IF LEFT$(W$(WP),1)<>RV$ THEN PRINT W$(WP);".":RET
URN
3200 PRINT W$;MID$(W$(WP),2);": ";W$
3210 RETURN
3300 VX=DR(D,1):VY=DR(D,2)
3310 FT=-1:NC=0
3320 EX=X+VX*(LEN(NWS)-1):EY=Y+VY*(LEN(NWS)-1)
3330 IF X<1 OR X>GX OR Y<1 OR Y>GY THEN FT=0:RETURN
3340 IF EX<1 OR EX>GX OR EY<1 OR EY>GY THEN FT=0:RETUR
N
3350 FOR Z=1 TO LEN(NWS)
3360 TS=PS(X,Y):IF TS="" THEN 3400
3370 IF LEN(T$)=3 THEN TS=MID$(T$,3)
3380 IF TS=MID$(NWS,Z,1) THEN NC=NC+1:GOTO 3400

```



```

3390 FT=0:Z=LEN(NWS)
3400 X=X+VX:Y=Y+VY:NEXT Z:RETURN
4000 POKE 214,21:PRINT
4010 PRINT "PLACE CURSOR AT START, PRESS <RETURN>."
4020 GOSUB 5000:IF MF THEN RETURN
4030 BX=PX:BY=PY
4040 POKE 214,21:PRINT
4050 PRINT "PLACE CURSOR AT END, PRESS <RETURN>."
4060 GOSUB 5000:IF MF THEN RETURN
4070 EX=PX:EY=PY
4080 VX=EX-BX:VY=EY-BY:AX=ABS(VX):AY=ABS(VY)
4090 IF VY=0 THEN SL=0:GOTO 4110
4100 SL=VX/VY
4110 T=(ABS(SL)=0 OR ABS(SL)=1) AND ((AX=LEN(NWS)-1 OR
AY=LEN(NWS)-1) OR QF)
4120 IF T THEN VX=SGN(VX):VY=SGN(VY):EF=0:RETURN
4130 GOSUB 2700:POKE 214,20:PRINT
4140 PRINT "SORRY, I THINK YOU'VE MADE A MISTAKE."
4150 GOSUB 2800:IF QF THEN GOSUB 3000
4160 ON -(K$="T") GOTO 4000:EF=-1:RETURN
5000 POKE 214,PY+1:PRINT:PRINT TAB(PX+LM-1);BK$
5010 TS=PS(PX,PY):IF TS="" THEN TS=SP$
5020 POKE 214,PY+1:PRINT:PRINT TAB(PX+LM-1);TS;WH$
5030 GET K$:IF K$="" THEN 5000
5040 IF K$=RES THEN MF=0:RETURN
5050 IF NOT QF OR (K$<>SP$ AND K$<>E$) THEN 5100
5060 IF K$=E$ THEN MF=-1:RETURN
5070 WP=WP+1:IF WP>NW THEN WP=1
5080 POKE 214,19:PRINT:PRINT TAB(6);LEFT$(Z$,32)
5090 GOSUB 3100:GOTO 5000
5100 K=ASC(K$):IF K<>17 AND K<>29 AND K<>145 AND K<>15
7 THEN 5002
5105 IF K<>17 AND K<>29 AND K<>145 AND K<>157 THEN 500
0
5110 PX=PX+(K=157)-(K=29):PY=PY+(K=145)-(K=17)
5120 PX=PX+GX*((PX=GX+1)-(PX=0))
5130 PY=PY+GY*((PY=GY+1)-(PY=0)):GOTO 5000
6000 DATA 0,-1,1,-1,1,0,1,1,0,1,-1,1,-1,0,-1,-1
7000 DATA 10,10,20,15,37,15

```

```

J C L H O B Q K P A N E P O J Y S Y H F
J U S M S Q G K M S U B K K K E I M D F
O U A H L F Z W R T Z X H X D A Z M J Q
R X S S F W L W P F J F A G A I S X L V
L N I O Y C B Q X K C M V B P O D Y M V
I Q P T H I X C F B V X B E M Z K M U J
I S C Z H I Z U Y L T J A T F F Q R L G
W N A X Q M R C G X A B V D M J X F R S
B K P M Y E O D F V Z W F W S T Y A Z Q
R R Q D P B B S G T U X S V R Z S B N N
B H Y C G S S O S O Y D E A E S K A V G
O D V M T Z A I N O U Z E E W E R N R Z
X B C P W V N F H O L P R Y O T A U M P
V Z A G E A P L L U C B T U L I P S K R
C O Z S B O L C P V E Z L K F K Z I F A

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CIRCLE READER SERVICE 26

MARCH 1988 89

FLIGHT OF THE BUMBLE BEE

BY JOEY LATIMER

It's an unusually warm winter day and you're sunbathing in your backyard. The muscles in your tired body are just beginning to relax when you hear what sounds like a bee... A BIG BEE... hovering close to your toes! Startled, you cover up and scamper for the door. Entering the house, you nearly run into your daughter and her best friend sitting in front of the computer just inside the screen door.

"What are you doing?" you quiz the girls. "Oh, we were trying this month's Microtones pro-



gram, *Flight of the Bumble Bee*! We thought it would be fun!"

MUSICAL NOTE: Flight of the Bumble Bee is adapted from "The Flight of the Bumble Bee" by Nicolai Rimsky-Korsakov. This fast-paced song is a real workout for most musicians, but the computer handles it easily.

Apple II series/Flight of the Bumble Bee

```
10 DIM N(383):HOME:VTAB 10:HTAB 2
20 PRINT "THE FLIGHT OF THE BUMBLE BEE"
30 FOR X = 0 TO 28:READ D:POKE 768+X,D:NEXT X
40 FOR X = 1 TO 383:READ N(X):NEXT X
50 FOR X = 1 TO 383:POKE 8,N(X):POKE 6,15:CALL 768
60 IF X = 315 THEN FOR D = 1 TO 50:NEXT D
70 NEXT X:GOTO 50
1000 DATA 165,8,74,133,10,164,8,173,48,192
1010 DATA 136,234,234,208,251,165,7,56,229,10
1020 DATA 10,133,7,176,237,198,6,208,233,96
2000 DATA 29,31,29,31,33,35,37,40,42,45,47,50,53,57
2010 DATA 53,57,60,64,60,64,68,72,76,81,85,91,96,102
2020 DATA 108,114,108,114,121,128,96,102,108,114,108
2030 DATA 114,121,128,96,102,108,114,121,91,96,102,96
2040 DATA 102,108,114,121,114,108,102,96,102,108,114
2050 DATA 121,91,96,102,96,102,108,114,121,114,108
2060 DATA 102,96,102,108,114,108,114,121,128,121,114
2070 DATA 108,102,96,91,96,102,96,102,108,114,108,114
2080 DATA 121,128,121,114,108,102,96,85,81,76,72,76
2090 DATA 81,85,91,68,72,76,72,76,81,85,91,85,81,76
2100 DATA 72,76,81,85,91,68,72,76,72,76,81,85,91,85
2110 DATA 81,76,72,76,81,85,81,85,91,96,91,85,81,76
2120 DATA 72,68,72,76,72,76,81,85,81,85,91,96,91,85
2130 DATA 81,76,72,68,72,76,72,72,72,72,72,72,72,72
2140 DATA 68,76,68,76,68,76,68,76,72,72,72,72,72,72
2150 DATA 72,72,68,76,68,76,68,76,68,76,72,68,72,76
2160 DATA 72,68,72,76,72,68,72,76,72,68,72,76,72,68
2170 DATA 64,60,57,60,64,60,64,68,72,68,64,60,57,60,64,68
2180 DATA 53,53,53,53,53,53,53,53,53,53,53,53,53,53
2190 DATA 50,57,53,53,53,53,53,53,53,53,53,53,53,53
2200 DATA 50,57,53,53,53,53,53,53,53,53,53,53,53,53
2210 DATA 53,57,53,53,53,53,53,53,53,53,53,53,53,53
2220 DATA 53,50,47,45,42,45,47,50,53,57,60,64,68,50
2230 DATA 53,57,53,57,60,64,68,64,60,57,57,60,64,60
2240 DATA 64,68,72,68,64,60,57,60,57,53,50,47,50,53
2250 DATA 57,53,57,60,64,60,64,68,72,76,81,85,91,96
2260 DATA 91,96,102,96,91,96,102,96,91,96,102,96,91
2270 DATA 96,102,96,91,85,81,76,72,68,64,60,64,60,57
2280 DATA 53,50,47,45,42,40,37,35,33,31
```

Atari 800/XL/XE/Flight of the Bumble Bee

```
10 DIM N(383):PRINT CHR$(125):POSITION 2,10:POKE 752,1
20 PRINT "THE FLIGHT OF THE BUMBLE BEE"
30 FOR X=1 TO 383:READ N(X):N(X)=N(X)
40 FOR X=1 TO 383:SOUND 0,N(X),10,15
50 FOR DE=1 TO 30:NEXT DE:SOUND 0,0,0
```

```
60 IF X=315 THEN FOR DE=1 TO 30:NEXT DE
70 NEXT X:GOTO 40
1000 DATA 29,31,29,31,33,35,37,40,42,45,47,50,53,57
1010 DATA 53,57,60,64,60,64,68,72,76,81,85,91,96,102
1020 DATA 108,114,108,114,121,128,96,102,108,114,108
1030 DATA 114,121,128,96,102,108,114,121,91,96,102,96
1040 DATA 102,108,114,121,114,108,102,96,102,108,114
1050 DATA 121,91,96,102,96,102,108,114,121,114,108
1060 DATA 102,96,102,108,114,108,114,121,128,121,114
1070 DATA 108,102,96,91,96,102,96,102,108,114,108,114
1080 DATA 121,128,121,114,108,102,96,85,81,76,72,76
1090 DATA 81,85,91,68,72,76,72,76,81,85,91,85,81,76
1100 DATA 72,76,81,85,91,68,72,76,72,76,81,85,91,85
1110 DATA 81,76,72,76,81,85,81,85,91,96,91,85,81,76
1120 DATA 72,68,72,76,72,76,81,85,81,85,91,96,91,85
1130 DATA 81,76,72,68,72,76,72,72,72,72,72,72,72,72
1140 DATA 68,76,68,76,68,76,68,76,72,72,72,72,72,72
1150 DATA 72,72,68,76,68,76,68,76,68,76,72,68,72,76
1160 DATA 72,68,72,76,72,68,72,76,72,68,72,76,72,68
1170 DATA 64,60,57,60,64,68,72,68,64,60,57,60,64,68
1180 DATA 53,53,53,53,53,53,53,53,53,53,53,53,53,53
1190 DATA 50,57,53,53,53,53,53,53,53,53,53,53,53,53
1200 DATA 50,57,53,53,53,53,53,53,53,53,53,53,53,53
1210 DATA 53,57,53,53,53,53,53,53,53,53,53,53,53,53
1220 DATA 53,50,47,45,42,45,47,50,53,57,60,64,68,50
1230 DATA 53,57,53,57,60,64,68,64,60,57,57,60,64,60
1240 DATA 64,68,72,68,64,60,57,60,57,53,50,47,50,53
1250 DATA 57,53,57,60,64,60,64,68,72,76,81,85,91,96
1260 DATA 91,96,102,96,91,96,102,96,91,96,102,96,91
1270 DATA 96,102,96,91,85,81,76,72,68,64,60,64,60,57
1280 DATA 53,50,47,45,42,40,37,35,33,31
```

Commodore 64 & 128 (C 64 mode)/Flight of the Bumble Bee

```
10 DIM H(383),L(383):S=54272:FOR X=0 TO 23:POKE S+X,0
20 NEXT X:POKE S+5,68:POKE S+6,68:POKE S+24,15
30 PRINT CHR$(147):CHR$(158):POKE 53281,0:POKE 53280,7
40 POKE 214,10:PRINT
50 PRINT TAB(2):"THE FLIGHT OF THE BUMBLE BEE"
60 FOR X=1 TO 383:READ H(X),L(X):NEXT X
70 FOR X=1 TO 383:POKE S+4,33:POKE S,L(X)
80 POKE S+1,H(X):FOR DE=1 TO 36:NEXT DE:POKE S+4,32
90 IF X=315 THEN FOR DE=1 TO 50:NEXT DE
100 NEXT X:GOTO 70
1000 DATA 67,15,63,75,67,15,63,75,59,190,56,99,53,57
1010 DATA 50,60,47,107,44,193,42,62,39,223,37,162,35
1020 DATA 134,37,162,35,134,33,135,31,165,33,135,31
1030 DATA 165,29,223,28,49,26,156,25,30,23,181,22,96
1040 DATA 21,31,19,239,18,209,17,195,18,209,17,195,16
1050 DATA 195,15,210,21,31,19,239,18,209,17,195,18,209
1060 DATA 17,195,16,195,15,210,21,31,19,239,18,209,17
1070 DATA 195,16,195,22,96,21,31,19,239,21,31,19,239
1080 DATA 18,209,17,195,16,195,17,195,18,209,19,239,21
1090 DATA 31,19,239,18,209,17,195,16,195,22,96,21,31
1100 DATA 19,239,21,31,19,239,18,209,17,195,16,195,17
1110 DATA 195,18,209,19,239,21,31,19,239,18,209,17,195
1120 DATA 18,209,17,195,16,195,15,210,16,195,17,195,18
1130 DATA 209,19,239,21,31,22,96,21,31,19,239,21,31,19
1140 DATA 239,18,209,17,195,18,209,17,195,16,195,15
1150 DATA 210,16,195,17,195,18,209,19,239,21,31,23,181
1160 DATA 25,30,26,156,28,49,26,156,25,30,23,181,22,96
1170 DATA 29,223,28,49,26,156,28,49,26,156,25,30,23
1180 DATA 181,22,96,23,181,25,30,26,156,28,49,26,156
1190 DATA 25,30,23,181,22,96,29,223,28,49,26,156,28,49
1200 DATA 26,156,25,30,23,181,22,96,23,181,25,30,26
1210 DATA 156,28,49,26,156,25,30,23,181,25,30,23,181
1220 DATA 22,96,21,31,22,96,23,181,25,30,26,156,28,49
1230 DATA 29,223,28,49,26,156,28,49,26,156,25,30,23
1240 DATA 181,25,30,23,181,22,96,21,31,22,96,23,181,25
1250 DATA 30,26,156,28,49,29,223,28,49,26,156,28,49,28
1260 DATA 49,28,49,28,49,28,49,28,49,28,49,28,49,29
1270 DATA 223,26,156,29,223,26,156,29,223,26,156,29
1280 DATA 223,26,156,28,49,28,49,28,49,28,49,28,49,28
1290 DATA 49,28,49,28,49,29,223,26,156,29,223,26,156
1300 DATA 29,223,26,156,29,223,26,156,28,49,29,223,28
```



```

1310 DATA 49,26,156,28,49,29,223,28,49,26,156,28,49,29
1320 DATA 223,28,49,26,156,28,49,29,223,28,49,26,156
1330 DATA 28,49,29,223,31,165,33,135,35,134,33,135,31
1340 DATA 165,29,223,28,49,29,223,31,165,33,135,35,134
1350 DATA 33,135,31,165,29,223,37,162,37,162,37,162,37
1360 DATA 162,37,162,37,162,37,162,37,162,39,223,35
1370 DATA 134,39,223,35,134,39,223,35,134,39,223,35
1380 DATA 134,37,162,37,162,37,162,37,162,37,162,37
1390 DATA 162,37,162,37,162,39,223,35,134,39,223,35
1400 DATA 134,39,223,35,134,39,223,35,134,37,162,39
1410 DATA 223,37,162,35,134,37,162,39,223,37,162,35
1420 DATA 134,37,162,39,223,37,162,35,134,37,162,39
1430 DATA 223,37,162,35,134,37,162,39,223,42,62,44,193
1440 DATA 47,107,44,193,42,62,39,223,37,162,39,223,42
1450 DATA 62,44,193,47,107,44,193,42,62,39,223,37,162
1460 DATA 35,134,33,135,31,165,29,223,39,223,37,162,35
1470 DATA 134,37,162,35,134,33,135,31,165,29,223,31
1480 DATA 165,33,135,35,134,35,134,33,135,31,165,33
1490 DATA 135,31,165,29,223,28,49,29,223,31,165,33,135
1500 DATA 35,134,33,135,35,134,37,162,39,223,42,62,39
1510 DATA 223,37,162,35,134,37,162,35,134,33,135,31
1520 DATA 165,33,135,31,165,29,223,28,49,26,156,25,30
1530 DATA 23,181,22,96,21,31,22,96,21,31,19,239,21,31
1540 DATA 22,96,21,31,19,239,21,31,22,96,21,31,19,239
1550 DATA 21,31,22,96,21,31,19,239,21,31,22,96,23,181
1560 DATA 25,30,26,156,28,49,29,223,31,165,33,135,31
1570 DATA 165,33,135,35,134,37,162,39,223,42,62,44,193
1580 DATA 47,107,50,60,53,57,56,99,59,190,63,75

```

IBM PC & compatibles/Flight of the Bumble Bee

```

10 DIM A$(25):CLS:KEY OFF:LOCATE 10,2
20 PRINT "★-- THE FLIGHT OF THE BUMBLE BEE --★"
30 FOR X=1 TO 25:READ A$(X):NEXT X
40 FOR X=1 TO 25:PLAY A$(X):NEXT X:GOTO 40
1000 DATA T155L1603><B>C<BAHAGHGF#F
1010 DATA ED#DC#DC#C<B>C<BB-AGHGF#F
1020 DATA ED#DC#DC#C<B>ED#DC#DC#C<B
1030 DATA >ED#DC#CFED#ED#DC#CC#DD#
1040 DATA ED#DC#CFED#ED#DC#CC#DD#
1050 DATA ED#DC#DC#C<B>CC#DD#EFED#
1060 DATA ED#DC#DC#C<B>CC#DD#EF#GG#
1070 DATA AGHGF#FB-AGHAGHGF#FF#GG#
1080 DATA AGHGF#FB-AGHAGHGF#FF#GG#
1090 DATA AGHGF#GF#FEFF#GGHAB-AGH
1100 DATA AGHGF#GF#FEFF#GGHAB-AGH
1110 DATA AAAAAAAB-GHB-GHB-GHB-GH
1120 DATA AAAAAAAB-GHB-GHB-GHB-GH
1130 DATA AB-AGHAB-AGHAB-AGHAB-AGH
1140 DATA AAB>CC#CCBB-AA#B>CC#CCBB-
1150 DATA >DDDDDDDE-C#E-C#E-C#E-C#
1160 DATA DDDDDDDDE-C#E-C#E-C#E-C#
1170 DATA DE-DC#DE-DC#DE-DC#DE-DC#
1180 DATA DE-EFF#FEE-DE-EFF#FEE-
1190 DATA DC#C<BB->E-DC#DC#C<BB-B>CC#
1200 DATA DC#C<BB->E-DC#DC#C<BB-B>CC#
1210 DATA P16C#C<B>C<BB-AB-B>CC#CC#DD#
1220 DATA ED#DC#DC#C<B>C<BB-AGHGF#F
1230 DATA EFED#EFED#EFED#EFED#
1240 DATA EFF#GGHAB-B>C<B>CC#DD#EF
1250 DATA EFF#GGHAB-B>C<B>CC#DD#EF,F#GGHAB-B

```

Macintosh/Flight of the Bumble Bee

```

DEFINT W:DIM N(384),WAV(256)
WINDOW 1,"MICROTONES", (0,38)-(527,338)
LOCATE 8,15
PRINT "★-- THE FLIGHT OF THE BUMBLE BEE --★"
FOR X=-128 TO 127:WAV(X+129)=X:NEXT X:WAVE 0,WAV
FOR X=1 TO 384:READ N(X):NEXT X
SOUNDLOOP:
FOR X=1 TO 384:SOUND N(X)/2,1,3,,0
SOUND 0,,3,,0:NEXT X:GOTO SOUNDLOOP
DATA 1047,988,1047,988,932,880,831,784,740,698,659
DATA 622,587,554,587,554,523,494,523,494,466,440
DATA 415,392,370,349,330,311,294,277,294,277,262

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DATA 247,330,311,294,277,294,277,262,247,330,311
DATA 294,277,262,349,330,311,330,311,294,277,262
DATA 277,294,311,330,311,294,277,262,349,330,311
DATA 330,311,294,277,262,277,294,311,330,311,294
DATA 277,294,277,262,247,262,277,294,311,330,349
DATA 330,311,330,311,294,277,294,277,262,247,262
DATA 277,294,311,330,370,392,415,440,415,392,370
DATA 349,466,440,415,440,415,392,370,349,370,392
DATA 415,440,415,392,370,349,466,440,415,440,415
DATA 392,370,349,370,392,415,440,415,392,370,392
DATA 370,349,330,349,370,392,415,440,466,440,415
DATA 440,415,392,370,392,370,349,330,349,370,392
DATA 415,440,466,440,415,440,440,440,440,440,440
DATA 440,440,466,415,466,415,466,415,466,415,440
DATA 440,440,440,440,440,440,440,466,415,466,415
DATA 466,415,466,415,440,466,440,415,440,466,440
DATA 415,440,466,440,415,440,466,440,415,440,466
DATA 494,523,554,523,494,466,440,466,494,523,554
DATA 523,494,466,587,587,587,587,587,587,587,587
DATA 622,554,622,554,622,554,622,554,587,587,587
DATA 587,587,587,587,587,587,622,554,622,554,622,554
DATA 622,554,587,622,587,554,587,622,587,554,587
DATA 622,587,554,587,622,587,554,587,622,659,698
DATA 740,698,659,622,587,622,659,698,740,698,659
DATA 622,587,554,523,494,466,622,587,554,587,554
DATA 523,494,466,494,523,554,0,554,523,494
DATA 523,494,466,440,466,494,523,554,523,554,587
DATA 622,659,622,587,554,587,554,523,494,523,494
DATA 466,440,415,392,370,349,330,349,330,311,330
DATA 349,330,311,330,349,330,311,330,349,330,311
DATA 330,349,370,392,415,440,466,494,523,494,523
DATA 554,587,622,659,698,740,784,831,880,932,988

```

Tandy Color Computer/Flight of the Bumble Bee

```

10 DIM N(383):CLS
20 PRINT@193,"-THE FLIGHT OF THE BUMBLE BEE-"
30 FOR X=1 TO 383:READ N(X):NEXT X
40 FOR X=1 TO 383:SOUND N(X),1
50 IF X=315 THEN FOR DE=1 TO 50:NEXT DE
60 FOR DE=1 TO 10:NEXT DE:NEXT X:GOTO 40
1000 DATA 239,238,239,238,237,236,234,232,231,229,227
1010 DATA 225,223,221,223,221,218,216,218,216,213,210
1020 DATA 207,204,200,197,193,189,185,180,185,180,176
1030 DATA 170,193,189,185,180,185,180,176,170,193,189
1040 DATA 185,180,176,197,193,189,193,189,185,180,176
1050 DATA 180,185,189,193,189,185,180,176,197,193,189
1060 DATA 193,189,185,180,176,180,185,189,193,189,185
1070 DATA 180,185,180,176,170,176,180,185,189,193,197
1080 DATA 193,189,193,189,185,180,185,180,176,170,176
1090 DATA 180,185,189,193,200,204,207,210,207,207,200
1100 DATA 197,213,210,207,210,207,204,200,197,200,204
1110 DATA 207,210,207,204,200,197,213,210,207,210,207
1120 DATA 204,200,197,200,204,207,210,207,204,200,204
1130 DATA 200,197,193,197,200,204,207,210,213,210,207
1140 DATA 210,207,204,200,204,200,197,193,197,200,204
1150 DATA 207,210,213,210,207,210,210,210,210,210,210
1160 DATA 210,210,213,207,213,207,213,207,213,207,210
1170 DATA 210,210,210,210,210,210,210,213,207,213,207
1180 DATA 213,207,213,207,210,213,210,207,210,213,210
1190 DATA 207,210,213,210,207,210,213,210,207,210,213
1200 DATA 216,218,221,218,216,213,210,213,216,218,221
1210 DATA 218,216,213,223,223,223,223,223,223,223,223
1220 DATA 225,221,225,221,225,221,225,221,225,223,223
1230 DATA 223,223,223,223,223,225,221,225,221,225,221
1240 DATA 225,221,223,225,223,221,223,225,223,221,223
1250 DATA 225,223,221,223,225,223,221,223,225,227,229
1260 DATA 231,229,227,225,223,225,227,229,231,229,227
1270 DATA 225,223,221,218,216,213,225,223,221,223,221
1280 DATA 218,216,213,216,218,221,221,218,216,218,216
1290 DATA 213,210,213,216,218,221,218,221,223,225,227
1300 DATA 225,223,221,223,221,218,216,218,216,213,210
1310 DATA 207,204,200,197,193,197,193,189,193,197,193
1320 DATA 189,193,197,193,189,193,197,193,189,193,197
1330 DATA 200,204,207,210,213,216,218,216,218,221,223
1340 DATA 225,227,229,231,232,234,236,237,238

```


TIPS TO THE TYPIST

Typing BASIC programs from FAMILY & HOME-OFFICE COMPUTING is a great way to learn about programming and get some free software to boot! But it's frustrating to type in a long program, only to find it doesn't work as it should. If you're new to typing in programs, here are some tips to help make your first experiences rewarding ones.

BEFORE TYPING IN A PROGRAM

1. Check to see if it will run on your computer under a version of BASIC you have available. Also check to see if special hardware—a disk drive, joysticks, or a printer, for example—is required. Unless the program heading indicates otherwise, you can assume that a program will run under any standard version of BASIC on any standard hardware configuration of your machine. Note the following for future reference:

- A program coverage chart and a list of the exact systems we test on appear in The Programmer.

- "Apple II series" programs will run under Applesoft BASIC on the Apple II plus (w/language card), IIc, and IIc. Programs requiring a disk drive will work equally well under DOS 3.3 or ProDOS.

- IBM compatibility of BASIC programs is determined by both the hardware and the version of BASIC used. Our programs for IBM PC and compatibles are composed on IBM PC and PCjr's, and are tested under most versions of BASIC available for these machines. They are then tested on a variety of IBM-compatible machines under the versions of BASIC supplied with them.

2. If you have a disk drive, prepare ("format" or "initialize") a disk so you can save the program once you're finished typing. Your DOS (Disk Operating System) manual or disk-drive manual will tell you how.

3. Get your version of BASIC fired up and ready. Read the introductory chapters of your BASIC manual for instructions.

WHILE TYPING, KEEP IN MIND THAT . . .

1. BASIC programs consist of "lines," each beginning with a line number (Macintosh BASIC "lines" don't need line numbers), containing letters, numbers, and punctuation marks of various kinds. Each "line" may be composed of several "statements"—instructions that tell the computer to perform various actions—and may continue over several physical lines on the page and/or on your screen.

When typing in a BASIC program, forget considerations of format and get the *content* of what you type to match the *content* of what you see on the printed page. Regardless of how margins may break up a program "line," it hasn't ended until you reach another line number or the end of the program listing. Begin typing with the line number, then continue on, typing every letter, number, space, and punctuation mark in the order it appears, ignoring margins. Where the "line" ends, there will usually be some trailing spaces (which you don't have to type in), followed by the next line number at the left margin of the listing. At this point, all you have to do is press the RETURN or ENTER key to register the "line" in memory, then continue with the next "line."

2. All marks in a program listing—including every letter,

number, space, and punctuation mark—*mean* something to your computer. Moreover, even symbols that look very similar to you mean completely different things to the machine. For example, it is important to distinguish between "1" (number one) and "l" (small letter "L"), or "O" (capital letter "O") and "0" (digit zero). Note that zeros are slashed in listings to facilitate discrimination.

It's important, therefore, to duplicate every line exactly when typing. Otherwise you can't expect the program to work as it should, or even work at all. Even uppercase versus lowercase is important on certain computers; the words "PRINT" and "print" may mean different things.

3. Each computer has its own commands and keys for program "editing," and your user's manual will tell you how to use them. Besides the editing keys, there are two sure-fire ways of correcting errors in a BASIC program line. If you're just typing along and make a mistake, press the backspace-delete key (the back-arrow key on most systems) to rub out the offending character, and then continue typing. Once you've pressed RETURN or ENTER to register the line, mistakes are a little harder to fix. You must use the editing keys or type the line in again from the beginning (including the line number) and press RETURN or ENTER. The new line will replace the old one with the same line number in your computer's memory. This option is a little more work, but foolproof.

AFTER YOU'VE FINISHED . . .

1. Just type RUN and press RETURN or ENTER. If you've typed everything correctly, the program should work as described.

2. Of course, it almost never does, not even for seasoned programmers. Typing in a program and having it run off the bat qualifies as a small miracle. Usually there are one or more mistakes, major or minor, that have slipped past your careful scrutiny and are causing your computer to do unexpected things. Not to worry. Now comes what some people consider the most enjoyable part of the programming process: a procedure called "debugging"—finding and eliminating your mistakes. To review portions of your program on the computer screen, use the LIST command as explained in your BASIC manual. If you have a printer, you might find it more convenient to print out what you've typed (check your manual for the appropriate command). Look over each section of the program carefully, preferably with someone else's help. Make sure you haven't dropped a line or a character, miscounted spaces between a pair of quotes, mistaken a comma for a period, mixed up an "O" and a zero, or (most likely) all of the above. When you find a mistake, retype the offending line from the original listing, including the line number, and press RETURN or ENTER as explained above.

Naturally, mistakes tend to occur more frequently in certain areas of a program than in others. Complicated equations are easy to foul up by dropping or mismatching parentheses or math symbols. Data statements—program lines beginning with the usual number, followed by the word DATA—are another popular trouble spot. Check them carefully. And, of course, remember to SAVE a copy of the corrected program when you're finished.

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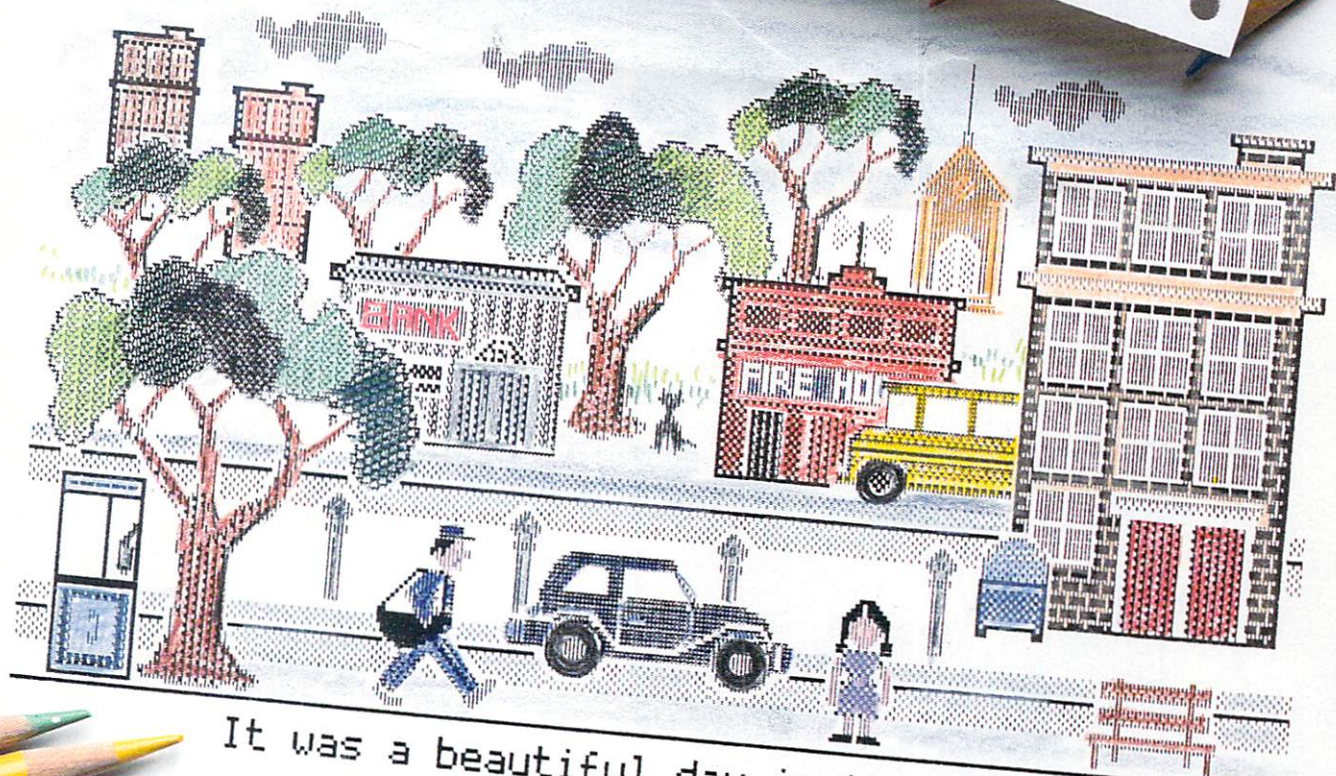
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